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Materials for the history of the history of science

It may be worthwhile to put together as has been done in the following list all the articles devoted to historians of science and to scientific philosophers which have hitherto appeared in *Isis* and *Osiris*. Indeed these articles constitute materials of the first order for any retrospective survey of our studies. Each is valuable in itself, and enhances the value of every other. It is hoped that this collection will be appreciated by our readers and that it will encourage them to complete it. Each volume of *Isis* should contain at least one article reviewing the life and work of one of our predecessors. Many of these are still unknown not only to the general public, but even to their own successors.

The biographies hitherto published are arranged in alphabetical order. Most of them are followed by a bibliography and illustrated with a portrait.

1. BALL, W.W.R. (1850-1925). *Isis* 8, 321-24, 1926.
2. BERGSTRAESSER, G. (1886-1933). *Isis* 25, 60-2, 1936.
3. BERTHELOT, M. (1827-1907). *Isis* 6, 479-99, 1924.
4. BOSMANS, H. (1852-1928). *Isis* 12, 88-112, 1929.
5. CAJORI, F. (1859-1930). *Isis* 17, 384-407, 1932.
6. CHASLES, MICHEL (1793-1880). *Osiris* 1, 421-50, 1936.
7. DREYER, J.L.E. (1852-1926). *Isis* 21, 131-44, 1934.
8. ENESTRÖM, G. (1852-1923). *Isis* 8, 313-20, 1926.
9. FAVARO, A. (1847-1922). *Isis* 7, 456-67, 1925.
10. HALLIWELL, J.O. (1820-89). *Isis* 18, 127-32, 1932.
11. HARRISON, F. (1831-1923). *Isis* 6, 387-90, 1924.
12. HEIBERG, J.L. (1854-1928). *Isis* 11, 367-74, 1928.
13. HOPPE, E. (1854-1928). *Isis* 13, 45-50, 1929.
14. HOUSSAY, F. (1860-1920). *Isis* 7, 433-55, 1925.
15. IRSAY, S.D'. (1894-1934). *Isis* 24, 370-74, 1936.
16. JOHNSSON, J.W.S. (1868-1929). *Isis* 13, 320-24, 1930.

17. JOURDAIN, PH. E. B. (1879-1919). *Isis* 5, 126-36, 1923.
18. LITTRÉ, E. (1801-81). *Isis* 8, 77-102, 1926.
19. MILHAUD, G. (1858-1918). *Isis* 3, 391-95, 1921.
20. MONTUCLA, J.E. (1725-99). *Osiris* 1, 519-67, 1936.
21. RIGNANO, E. (1870-1930). *Isis* 15, 158-62, 1931.
22. SCHOCH, C. (1873-1929). *Isis* 15, 163-69, 1931.
23. SCHOY, C. (1877-1925). *Isis* 9, 83-95, 1927.
24. SMITH, E.F. (1854-1928). *Isis* 11, 375-84, 1928.
25. SPENCER, H. (1820-1903). *Isis* 3, 375-90, 1921.
26. SUTER, H. (1848-1922). *Isis* 5, 409-17, 1923; 18, 166-83, 1932.
27. VASSILIEFF, A.V. (1855-1929). *Isis* 14, 342-48, 1930.
28. WIEDEMANN, E. (1852-1928). *Isis* 14, 166-86, 1930.
29. WIELEITNER, H. (1874-1931). *Isis* 18, 150-65, 1932.

It is interesting to rename these men in chronological order of their death years, as follows :

1799 MONTUCLA
1880 CHASLES
1881 LITTRÉ
1889 HALLIWELL
1903 SPENCER
1907 BERTHELOT
1918 MILHAUD
1919 JOURDAIN
1920 HOUSSAY
1922 FAVARO
SUTER
1923 ENESTRÖM
HARRISON
1925 BALL
SCHOY
1926 DREYER
1928 BOSMANS
HEIBERG
HOPPE
SMITH, E.F.
WIEDEMANN
1929 JOHNSSON
SCHOCH
VASSILIEFF
1930 CAJORI
RIGNANO
1931 WIELEITNER
1933 BERGSTRAESSER
1934 D'IRSAY

To conclude we may be permitted to recall that every volume of *Osiris* is dedicated to a living historian of science, and contains biographical data concerning him as well as a full bibliography and a portrait. Vol. 1 was dedicated to DAVID EUGENE SMITH, historian of mathematics, vol. 2 to Sir THOMAS L. HEATH, historian of Greek mathematics, and vol. 3 will be dedicated to E. O. v. LIPPMANN, historian of chemistry. Thus a collection of *Osiris*

will constitute a series of monuments in remembrance of great historians of science. In order to evidence this, we would advise our readers to have the name of each historian printed by the binder upon the back of the volume dedicated to him.

Cambridge, Mass. GEORGE SARTON.
3610.04

Note on "The Meanings of the philosophers by al-Ghazzālī"

(*Isis*, No. 69, Vol. XXV. 1, May, 1936, pp. 9-15)

An article "ALGAZEL et les Latins" by Fr. D. SALMAN, O. P., (Le Saulchoir), in *Archives d'histoire doctrinale et littéraire du Moyen Age*, 1935-1936, pp. 103-127, has added very greatly to our knowledge of the medieval Latin translation of AL-GHAZZĀLĪ's MAQĀṢID. Fr. SALMAN shows that at least one MS survives of that translation containing AL-GHAZZĀLĪ's prologue in which he explains that this book is simply a reproduction of the teachings of the philosophers and does not represent his own views and that another book will follow, the *Tahāfut*, containing a criticism of these teachings. This MS is B. N., Lat. 16096 and was used by Prof. MUCKLE in his edition. He, however, rejected it as a foundation for his text and does not seem to have noticed that it contains the, otherwise missing, Prologue. He rejected it because he was ignorant of its date and its perfectly assured history and also of the use made of it by MUNK in his *Mélanges*, p. 370. Fr. SALMAN also shows that the Prologue was known to ROGER BACON and to RAYMOND MARTIN of the *Pugio Fidei*. It is, therefore, certain that a complete copy of the Arabic *Maqāṣid* reached the medieval West and was put into Latin there, but we are still in the dark as to how that Latin translation came to be curtailed of its Prologue and ending. Finally, an Arabist cannot restrain himself from adding here that a great part of the confusion has arisen out of the refusal of Western Medievalists to pay any attention to the Arabic evidence, which is very much as though a student of CICERO's philosophical writings should refuse to learn Greek and to consult CICERO's Greek teachers. In 1859 S. MUNK put the matter perfectly clearly with citations of Arabic, Latin and Hebrew authorities and in 1928 the point was restated with still more Arabic

authorities by L. GAUTHIER in the *Rev. d'hist. de la philos.* for that year, pp. 358-365. Will the present perfectly conclusive article by Fr. SALMAN, one of themselves, in one of their own journals, make any impression on them? May it even lead some of them to learn some Arabic!

(Hartford, Conn.) D. B. MACDONALD.

Joh. Christ. Polykarp Erxleben, der erfolgreiche Bekämpfer des „Acidum pingue"-Interregnums in der Chemie (1775-76).

Anlässlich des 200 jährigen Geburtsjahres JOSEPH BLACKS schrieb ich (1): „Die Entwickelungskurve der chemischen Wissenschaft im 18. Jahrhundert weist zwischen den durch die Namen BECHER-STAHL und LAVOISIER charakterisierten Kurvenästen eine Art Interregnumskurve auf, deren aus der verflachten BECHER-STAHL-schen Linie steil aufsteigender Ast mit dem Namen JOSEPH BLACKS, andererseits im abfallenden Teile mit dem JOH. FRIEDR. MEYERS verknüpft ist... Er (BLACK) erkannte und wog als erster ‚fixe Luft', wie er die im gewöhnlichen Kalkstein, in dem Magnesit (2) usw. konstituierend gebundene Kohlensäureluftart nannte, und inaugurierte damit das Zeitalter der pneumatisch (2) und quantitativ überlegenden Chemie, die, nach einem Rückfall in den Gedankenkreis des Acidum pingue FRIEDR. MEYERS, in das antiphlogistische System LAVOISIERS hinüberführte." In meinem bald darauf in BUGGES „Buch der grossen Chemiker" (3) erschienenen Beitrag über BLACK ging ich auf diesen Interregnumskomplex, auf den 1764 einsetzenden und den bis 1776 immer heftiger werdenden Kampf zwischen „Blackianern" und „Meyerianern", auf den Versuch GUYTON DE MORVEAUS von 1773 zur „Parallelisierung" dieser beiden Systeme (4) etwas näher ein und wies dann auch

(1) *Chemiker-Zeitung* (Köthen), 52. Jahrg. (1928), S. 913.

(2) Infolge eines Druckfehlers steht dort fälschlich „in der Magnesia" (statt : in dem Magnesit), dann „pneumatischen" : (statt pneumatisch).

(3) Band I (1929), S. 240-252, speziell S. 248-251.

(4) A. e. a. O., S. 250-51.—Bei dieser Gelegenheit sei die Ausdrucksweise „bis JACQUIN" (S. 251, Zeile 1 von oben) berichtigt, es muss heissen : „nachdem JACQUIN..." JACQUIN war nämlich bereits 1769 mit seinem Bekenntnis zu BLACK, GUYTON DE MORVEAU aber mit seinen *Réflexions sur le parallèle du phlogistique*

auf den vergessenen, aber entscheidenden Abhalfterungsangriff JOH. CHRIST. POLYKARP ERXLEBENS von 1776 auf das MEYERische „Acidum pingue", hin.

„Der Umsturz der Theorie vom acidum pingue (ist)" — wie HERMANN KOPP so treffend bemerkt (5) — „das Vorspiel der Widerlegung der ganzen Phlogistontheorie; in allen Einzelheiten gleichen sich die Reform der Lehre von der Kaustizität durch BLACK und die spätere Reform der Lehre von der Verbrennung durch LAVOISIER; in allen Einzelheiten entsprechen sich die Einwürfe, welche die Anhänger der älteren Ansichten gegen die Neuerungen machten, die Übergänge, auf welchen den nicht mehr abzuweisenden neuen Lehren beizutreten man sich endlich entschloss." Und LAVOISIERS eigenartige Rolle in diesem Meinungsstreit über die Richtigkeit des BLACKschen bzw. MEYERschen Systems charakterisiert H. KOPP ebenfalls sehr überzeugend, wenn er ausführt (6): " LAVOISIER gibt hier [nämlich in seinen 1774 erschienenen, Opuscules physiques et chimiques' (7)] einen Bericht über die verschiedenen Ansichten hinsichtlich der Kausticität; seine Angaben über BLACKS Theorie sind sehr trocken, kurz und unbefriedigend; um so vollständiger werden die Ansichten über das acidum pingue und die Einwürfe gegen BLACKS Lehre hervorgehoben, und ihnen mehr als verdiente Anerkennung gezollt, so dass die Sache wirklich in dieser Darstellung aussieht, als ob der Standpunkt der Wissenschaft der Art sei, dass ihm die Hypothese einer Feuermaterie als Ursache der Kausticität bisher am besten entsprochen habe, als ob BLACKS Lehre eine individuelle Ansicht

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et du causticum ou acidum pingue erst in „N° 26 de l'*Avant-Coureur*, année 1773" (siehe das Schriftenverzeichnis GUYTON DE MORVEAUS auf S. XXXVII-XL in den *Mémoires de l'Académie de Dijon*, à Dijon, 1772, Tome second) hervorgetreten. —Ferner sei berichtigt, dass die deutsche Übersetzung von JACQUINS *Examen* nicht erst 1771 (wie in Fussnote 1 von S. 251 von mir irrig angegeben wurde), sondern bereits 1770 erschien.

(5) *Geschichte der Chemie*, Bd. III (1843 bzw. Manuldruck von 1931), S. 35-36.

(6) *Ebenda*, S. 41.

(7) *Physikalisch-chemische Schriften* LAVOISIERS, aus dem Französischen übersetzt von CHRIST. EHRENFR. WEIGEL, Greifswald, erster Band 1783, erster Teil: *Historischer kurzer Begriff der elastischen Ausflüsse, welche während der Verbrennung Gährung und während dem Brausen, von den Körpern entbunden werden.* S. 58-63 ist, als „Eilftes Kapitel" dann „Hn. MEYERS Lehre, von der Verkalchung der Kalcherde und der Ursache der ätzenden Kraft, des Kalchs und der Laugensalze" behandelt.

gewesen sei, die nicht überzeugt habe. Nachdem so der Einfluss BLACKS nach Kräften durch die Hervorhebung der gegen ihn gemachten Einwürfe neutralisirt, und die Sache noch gar nicht entschieden scheint, entscheidet (8) sie LAVOISIER, und zwar genau wie BLACK."

Und doch ging der Streit zwischen den „Blackianern" und „Meyerianern" weiter, bis 1775-1776 JOH. CHRIST. POLYKARP ERXLEBEN (9) in Göttingen, mit Wucht und entscheidend auftrat.

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(8) Dass man zu jener Zeit, als die *Opuscules* LAVOISIERS erschienen, der Meinung war, dass LAVOISIER in dem tobenden Meinungsstreit Partei ergreifen wolle, bezeugt z. B. auch der bekannte Technologe JOHANN BECKMANN in seiner, nur von ihm selbst herausgegebenen *Physikalisch-ökonomischen Bibliothek* (6. Bd., 1. Stück, S. 94-103) abgedruckten Rezension von LAVOISIERS *Opuscules*, in der er (S. 95) u. a. bemerkt : „Die Franzosen haben, bey dem Streit der Ausländer, über die figierte Luft und das acidum pingue, bisher fast blosse Zuschauer abgegeben; jetzt fangen sie häufig an, Parthey zu ergreifen, und beyde Meinungen erhalten Anhänger unter ihnen. Hr. LAVOISIER schlägt einen besonderen Weg ein, auf dem er, da er ihn ohne Vorurtheile betrit, noch wohl die Ehre, ein Schiedsrichter zu werden, erjagen kann..." In LAVOISIERS *Laboratoriums-Journal* vom 4. Juni 1773 (nicht 1874 wie M. BERTHELOT in seinem Werk *La Révolution chimique, Lavoisier*, 2. Aufl., Paris, 1902, S. 244, von Folio 60-61, angibt) findet sich eine Eintragung, die ebenfalls zeigen mag, dass LAVOISIER entscheidende Beweise für und wider diese beiden Lehrmeinungen beizubringen bemüht war. Es heisst da (a. e. a. O.) wörtlich : „Pour décider tout d'un coup et de manière à ne laisser aucune équivoque si la chaux donnait quelque chose à l'alkali caustique à la façon de MEYER; ou si au contraire la chaux lui enlevait quelque chose suivant l'hipothèse (*sic* !) anglaise (NB. nämlich nach BLACK !), j'ay fait l'expérience suivante."

(9) Sohn der ersten deutschen Ärztin DOROTHEA CHRISTIANE ERXLEBEN (geb. LEPORIN), geb. am 22. Juni 1744 zu Quedlinburg, gest. am 19. Aug. 1777 zu Göttingen, als Professor der Philosophie an der Universität. Er lehrte dort ursprünglich Vieharzneikunde, Mineralogie, Naturwissenschaften und zuletzt Physik. Sein Nachfolger war der berühmte LICHTENBERG. In den *Göttingischen Anzeigen von gelehrten Sachen, unter der Aufsicht der Königl. Gesellschaft der Wissenschaften* (Der zweyte Band auf das Jahr 1777, 108. Stück, vom 8. September 1777, S. 857) ist ihm folgende Todes-Anzeige gewidmet : „Den 18 Aug. (NB : Alle Biographien, z. B. in ERSCH und GRUBER, *Allgemeine Encyklopädie der Wissenschaften und Künste*, 1. Sect., 37. Theil, Leipzig 1842, S. 417 oder POGGENDORFF, *Biogr.-litterar. Handwörterbuch*, Bd. I, Leipzig 1863, Sp. 679, geben den Todestag mit 19. August 1777 an !) wird unserer Universität Herr JOH. CHRPH. ERXLEBEN, ordentlicher Professor der Philosophie und Mitglied der Kön. Societät der Wiss. in seinem drey und dreyssigsten Jahre an einem Geschwüre in der Leber entrissen; wir bedauren den Verlust eines jungen Lehrers von vielen Verdiensten und von den grössten Hoffnungen." Ein genaues Verzeichnis seiner Buchwerke ist in CHR. GOTTLOB KAYSERS *Bücher-Lexicon*, Bd. II, Leipzig, 1834, S. 155, Sp. 2 zu finden. Ein Bildnis von diesem Manne aufzutreiben, ist mir bisher nicht gelungen. Auch Herr Professor VOIT, Verwalter des Bildnis-Archivs der Göttin-

Den ersten Vorstoss machte er 1775 in seinem aus den Vorlesungen an der Universität erwachsenen Lehrbuch „Anfangsgründe der Chemie" (10). Nachdem er darin (in §§ 208 und 209, S. 139 bis 141) BLACKS Lehre von der fixen Luft und der Kaustizität (Ätzeigenschaft) des gebrannten Kalkes bzw. der Milde des Kalkes, der Magnesia und der Alkalien aus der Ab- bzw. Anwesenheit von gebundener „fixer" Luft (= CO^2) überzeugend erklärt hatte, legt er (in den folgenden §§ 210 und 211, S. 141-142) MEYERS Theorie mit den folgenden Worten dar: „Meyer meynt hingegen eben, bey dem Brennen des Kalkes, dringe aus dem dazu gebrauchten Feuer eine eigene Materie, welche in der Hitze selbst dichte Gefässe durchdringen könne, in den Kalk, und bewirkte die in demselben unter dem Brennen vorgehende Veränderung. Diese Materie bestehe aus dem reinsten Feuerwesen mit Säure verbunden; ihr Erfinder nennt sie daher *fette Säure* (acidum pingue). Die fette Säure mache den Kalk, mit dem sie sich verbunden hat, zur Auflösung im Wasser geschickt; sie verrathe sich in dem gebrannten Kalke und im Kalkwasser durch den ätzenden Geschmack, und deswegen nennt sie MEYER auch *Causticum* (11). Die Erhitzung beym Löschen des Kalkes entstehe von den losgemachten Feuertheilchen u. s. w." und dann: „Es streitet meiner Ansicht nach sehr mit dieser MEYERischen Theorie, dass man auf anderen gewöhnlichen Wegen sonst gleichwohl keine Spur einer Säure aus dem gebrannten Kalke entdecken kann. Auch ist es ietzt durch Versuche hinlänglich ausgemacht

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ger Universität bestätigte mir freundlichst, dass ein Konterfei POLYK. ERXLEBENS dort nicht vorhanden oder sonstwo bekannt ist.—Weder KOPP noch KAHLBAUM o. A. ist das Wirken ERXLEBENS in der Chemie bekannt geworden!

(10) „Von JOH. CHRIST. POLYK. ERXLEBEN, der Weltweisheit D. u. Prof. auf der Georgaugustuniversität, der Kön. Soc. der Wiss. und des Kön. Inst. der histor. Wiss. zu Göttingen, der Batavischen Societät der Experimentalphilosophie zu Rotterdam und der Kön. Landwirtschaftsgesellsch. zu Zelle Mitgliede, der Naturforsch. Gesellsch. zu Berlin Ehrenmitgliede", Göttingen, bey Dieterich, 1775. Die Vorrede ist vom Januar 1775 datiert. Eine „mit neuen Zusätzen vermehrt(e)" Auflage gab dann 1784 JOH. CHRIST. WIEGLEB in demselben Verlage heraus.

(11) Die Bezeichnung und die Vorstellung über die angebliche Wirksamkeit vom „Causticum" hat sich in der HAHNEMANNschen Homöopathie bis heute erhalten. Vgl. meine Ausführungen in der *Chemiker-Zeitung* (Köthen)Jahrg. 53 (1929), S. 987 bzw. 55 (1931), S. 914-915 über „SAMUEL HAHNEMANNS ‚Causticum'" bzw. über „Das utopische ‚Causticum' SAMUEL HAHNEMANNS."

dass man allerdings auch durch die Hitze verdichteter Sonnenstrahlen wirklich Kalk brennen könne, in denen sich doch nicht wohl das Daseyn einer fetten Säure annehmen lässt..." Hinsichtlich der Kaustifizierung der Alkalien stellt ERXLEBEN die beiden Theorien (in den §§ 214 bzw. 215, S. 145) in folgenden lapidaren Sätzen gegenüber: „Nach BLACKS Theorie muss man annehmen, dass das Laugensalz (alcali causticum) werde dadurch ätzend, dass ihm durch den zugesetzten gebrannten Kalk die ihm beywohnende fixe Luft entzogen wird..." bzw. „Nach MEYERS Meynung verbindet sich hingegen die in dem Kalk nach dem Brennen vorhandene fette Säure mit dem Laugensalze, und macht damit das ätzende Laugensalz aus, das daher seiner Theorie nach aus Säure und Laugensalz gemischt seyn soll: eine Behauptung, die gewisslich falsch ist, da man allen Versuchen zufolge das ätzende Laugensalz gänzlich ohne Säure findet". In der „Vorrede" dieser seiner „Anfangsgründe der Chemie" umreisst ERXLEBEN die wissenschaftliche Situation jener Zeit packend mit den Worten: „Das sehe ich voraus, dass nicht wenige mit meinem Buche ziemlich unzufrieden seyn werden... Dann fürchte ich besonders den Vertheidigern der MEYERischen Theorie von der fetten Säure zu missfallen: aber ich habe nach der sorgfältigsten Prüfung, die sich durch einige Jahre erstreckt hat, und mit Versuchen begleitet gewesen ist, der BLACKischen Lehre den Vorzug geben müssen, und hoffe doch so viel Toleranz von den Chemikern fordern zu dürfen, dass sie mein Buch nicht deswegen im Ganzen verwerfen, weil sie in einem Punkt, der freylich wichtig ist, anders denken als ich. Überhaupt wünschte ich aber, dass die Gegner der BLACKischen Lehre sich zu einer genauen und völlig unpartheyischen Prüfung dieser Lehre und ihrer eignen entgegengesetzten entschliessen möchten; dass sie dabey auch auf dasienige die nöthige Rücksicht nähmen (und ich darf wohl hinzusetzen, zum Theil sich auch erst bekannt machten), was die übrigen Naturforscher über die Natur des Feuers und andere dahin einschlagende Gegenstände schon so gut als zuverlässig ausgemacht haben. — Sie würden gewiss bemerken, dass gar oft keine wahren Schwierigkeiten sich da finden, wo sie welche wahrzunehmen glauben, und wo sie, um dieselben zu heben, bald zu einer fetten Säure, bald zum Feuer, wovon manche Chemisten wunderbare Dinge sagen, ihre Zuflucht nehmen."

Den Hauptstoss gegen die MEYERsche Lehre von der fetten Säure, für BLACKs Lehrmeinung, unternahm dann ERXLEBEN bald darauf, 1776, in seinem Beitrag „Über die fixe Luft und die fette Säure", in seinen „Physikalisch-chemischen Abhandlungen" (12). Veranlassung zur Abfassung und Herausgabe dieser Schrift gab JOH. GERH. REINH. ANDREAE (13), Hofapotheker in Hannover und ein spezieller Freund MEYERS, der auch ein Nachlasswerk (14) von diesem zum Druck befördert hatte, wie aus dem Vorwort hervorgeht, aus dem einige aufschlussreiche Stellen hier Platz finden mögen: „Hier haben Sie, mein werthester Freund, was Sie von mir gefordert haben. Sie urtheilten einmal, dass ich eine nützliche Arbeit unternehmen würde, wenn ich die beyden einander entgegengesetzten Theorien von der fixen Luft und der fetten Säure untereinander vergliche und in einer besonderen Schrift die Gründe für und wider eine jede abwöge. Ich habe es auf Ihr Verlangen gethan, und während dieser Arbeit selbst, wenn es möglich war, mich noch immer weiter von der Wahrheit des BLACKischen Systems, und der Falschheit des MEYERischen überzeugt. Wie zufrieden werde ich seyn, wenn ich auch andere davon überzeugen kann. Sie waren MEYERS Freund (15); es könnte in so fern etwas sonderbar scheinen, dass ich meine zur Widerlegung der MEYERischen Theorie abzielende Schrift gerade Ihnen zuschreibe. Aber Sie sind auch

(12) Erster (und einziger!) Band, Leipzig 1776, in der Weygandschen Buchhandlung, S. 1 bis 279. Ich hatte dieses Werk ERXLEBENs seiner Zeit [in BUGGEs *„Buch der grossen Chemiker"*[3]), S. 251, Fussnote 23] als „sehr selten", bezeichnet, da es in der Staatsbibliothek zu Berlin nicht vorhanden ist. In der Zwischenzeit konnte ich aber Exemplare in den Universitätsbibliotheken zu Bonn, Breslau, Halle und Kiel ausfindig machen. Tatsache ist es jedoch, dass die massgeblichen historiochemischen Werke, wie z. B. von KOPP, KAHLBAUM, E. v. MEYER usw., von diesem und den anderen chemischen Werken ERXLEBENs keine Kenntnis haben, ebensowenig von dessen Namen überhaupt.[9]

(13) Laut POGGENDORFFS *Biogr.-litterar. Handwörterbuch*, Bd. I, Leipzig 1863, Sp. 44: geb. 1724 und gest. 1793 in Hannover.

(14) *Alchymistische Briefe.* Von dem Verfasser der Chymischen Versuche zur näheren Erkäntniss des ungelöschten Kalchs, etc. an den Herausgeber gegenwärtiger Briefe. Hannover, bey H. E. C. SCHLÜTER, 1767, 4°, 61 Seiten. Am Schluss der Vorrede (S. 6) wirft der Herausgeber ANDREAE die Frage auf: „Bin ich doch noch sehr unschlüssig darüber: ob ich gegen die Ehre, mancher glänzenden Gelehrtengesellschaft anzugehoeren, diejenige vertauschen würde, meines Freundes Freund gewesen zu seyn."

(15) Dies und das unmittelbar Folgende bezieht sich auf den in unserer Fussnote 14 eben erwähnten Passus über ANDREAEs Freundschaft mit MEYER.

der Wahrheit Freund, und werden ihr nicht etwas Falsches vorziehen, wenn es auch MEYER gesagt hätte. Prüfen Sie meine Schrift, und wenn Sie einzelne Fehlschlüsse darinn wahrnehmen sollten, so verzeihen Sie die dem Verfasser, weil er ein Mensch ist. Im Ganzen und in der Hauptsache, fürchtet er nicht, gefehlt zu haben. Vielleicht sind Sie hin und wieder nicht mit dem Tone zufrieden, worinn ich rede. Manchmal habe ich freylich Ausdrücke gebraucht, die denen, welche sie angehen, nicht sehr gefallen können: aber muss einem nicht die Galle endlich überlaufen, wenn man Schriften lesen und widerlegen soll, wie ich habe lesen und widerlegen müssen? Wer kann kaltblütig dabey bleiben, wenn ihm die offenbarsten Wahrheiten nicht nur gerade zu, sondern auch in den unbescheidensten Ausdrücken abgeläugnet werden?... ich bin überzeugt, dass ein grosser Theil der Recensenten bey dieser Schrift gegen mich seyn werde, und einige mir sogar Grobheiten sagen werden: nicht weil ich das Lächerliche lächerlich, das Ungegründete ungegründet das Abgeschmackte abgeschmackt u. s. w. genannt habe, sondern weil ich das MEYERische System nicht wahr finden kann, von dem Einige nun Einmal beschlossen haben, es solle und müsse wahr seyn."

Das Vorwort dieser „Physikalisch-chemischen Abhandlung" ERXLEBENS ist vom 20. April 1776 datiert. Und dann zieht er vom Leder und rechnet mit den „Meyerianern" auf Grund eigener und sicherer Versuchsergebnisse von anderen bewährten Chemikern, worunter auch LAVOISIER mehrfach zitiert ist, gründlich und überzeugend zugunsten von BLACKS Lehrmeinung ab. Es darf nicht wundernehmen, dass er gezählte volle 276 Seiten, wenn auch in Kleinoktavformat, zu diesem Behuf in Anspruch nimmt, aber das MEYERsche „Acidum pingue" hatte sich bereits zu sehr in die Chemie eingefressen und selbst BLACK „schenkte" — wie ich früher (16) ausführte — „dieser Lehre grosse Aufmerksamkeit, wie sich aus mehreren Entwürfen unter seinen hinterlassenen Papieren ergibt, und er scheint die Einwürfe von jener Seite gegen seine Anschauungen auch dann noch wichtig genommen zu haben, als die Theorie von der fetten Säure schon längst verworfen war". Es ist hier nicht der Platz, den — bis

(16) Bei BUGGE[3]), S. 250.

auf kleine „Schnitzer" — durchaus geistvoll-logischen Deduktionen ERXLEBENS in diesem seinem, im „Untertitel" als „Eigene Untersuchungen und Prüfungen des von Andern darüber beygebrachten" bezeichneten Beitrag zu der in Rede stehenden Streitfrage zu folgen, es kann auf ihn nur verwiesen werden. Vielleicht setzen sich einflussreiche chemische Kreise oder Personen dafür ein, dass er in Gänze oder im Auszug in der OSTWALDschen Klassikersammlung zum Wiederabdruck gelangt, denn diese „Streitschrift kann" — wie ich schon früher (17) bemerkte — „noch heute mit Gewinn und Vergnügen gelesen werden."

Einen lateinischen Auszug daraus las ERXLEBEN kurz darauf in der Sitzung vom 8. Mai 1776 vor der Kgl. Societät der Wissenschaften in Göttingen (deren Mitglied er war) unter dem Titel: „Experimenta nonnulla Blackianam de aere fixo doctrinam spectantia", der dann in den Abhandlungen der Gesellschaft vom folgenden Jahr zum Abdruck gelangte (18), nachdem schon vorher in den unter der Aufsicht dieser Gesellschaft herausgegebenen „Göttingischen Anzeigen von Gelehrten Sachen" ein ausführliches deutsches Referat davon erschienen war (19).

ERXLEBEN hatte kurz vor seinem Tode — er starb 1777 — das Lehrgebäude MEYERS, das alles und nichts erklären konnte, zum Einfall gebracht. Daran ändert nichts, dass GIRTANNER in Göttingen noch 1781 und SCOPOLI in Pavia 1783 den Versuch einer Ehrenrettung der Feuermaterie im ungelöschten Kalk machten. WIEGLEB, der eifrigste Partisane MEYERS, streckte die Waffen. In der von ihm 1784 herausgegebenen 2. Auflage von ERXLEBENS „Anfangsgründe(n) der Chemie" (10) erklärte er (20), nachdem er bekannt hatte, dass er sich nicht „schäme... ein strenger Anhänger und Vertheidiger der MEYERischen Theorie gewesen zu seyn", schliesslich: „MEYERS Begriff von der fetten Säure lässt sich nicht weiter vertheidigen", nicht aber ohne bei

(17) Ebenda, S. 251.

(18) *Novi Commentarii Societatis regiae Scientiarvm Gottingensis*, Tomus VII, ad A 1776, Gottingae, apud... DIETERICH, 1777, S. 81-91. Auch hier weist ERXLEBEN (S. 81-82) darauf hin, dass er nach Abfassung seines *Vorlesungs-Lehrbuches* u. a. von ANDREAE in Hannover aufgefordert worden sei, eine besondere Abhandlung[12]) über diesen Fragenkomplex abzufassen und herauszugeben.

(19) Der erste Band auf das Jahr 1776, Göttingen, 72. Stück, S. 601-603, vom 15. Junii 1776.

(20) *Anfangsgründe*[10]), 2. Aufl. 1784, S. 169, Schluss-Anmerkung zu § 211.

diesem Rückzug noch zu fechten, mit den Worten: „aber bey der strengen BLACKischen Theorie habe ich auch noch Anstösse gefunden, die mir durchaus nicht genugthuend erklärt werden können", dies noch zu einer Zeit, als LAVOISIER sogar auch schon in Deutschland im Vormarsch war! Habent enim sua fata et theoriae!

(Berlin). MAX SPETER.

Al-Ḥakîm* Cornelius Van Alen Van Dyck (1818-1895)

For the proper evaluation of the life and works of CORNELIUS VAN ALEN VAN DYCK, American medical missionary to Syria in the nineteenth century, it is necessary to survey what took place in that land after the decline of the Arab civilization.

It is beyond the scope of this paper to cover the history of the transmission of knowledge into Arabic during the Umayyad and Abbasid Dynasties (662-1258 A.D.) (1) from Greek, Hindu, and other sources. A period of fruition followed that was not only instrumental in transmitting knowledge, but in adding considerably to it. (2) By the end of the thirteenth century, however, religious dogma and political dissension held sway, unhampered and supreme. The decline was furthered by the onward movement of the Mongol HULĀGŪ who sacked Baghdād, destroyed its libraries and put to death the Caliph, AL-MUSTA'ṢIM (1258 A. D.). The conquest of Granada by FERDINAND and ISABELLA in 1492 dealt a similar blow to the Arab culture in Andalusia. (3)

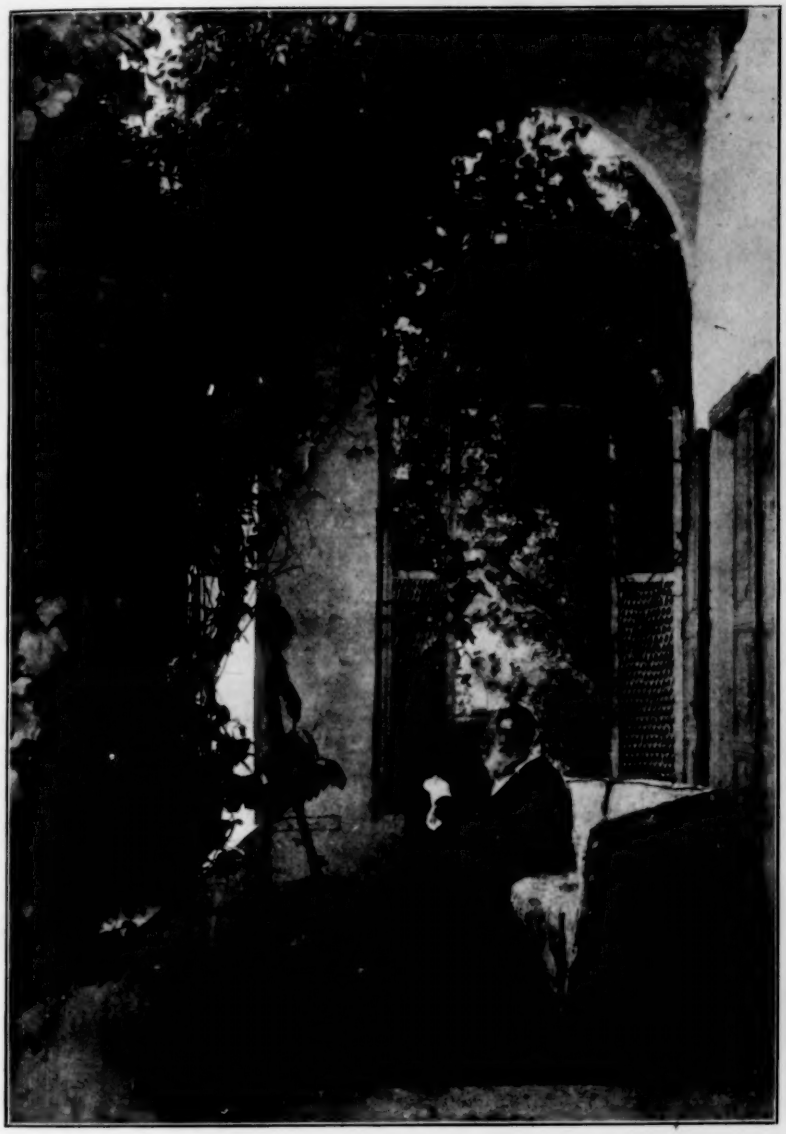
Under the hoofs of the Tartars in the East, Baghdād was buried; and below the shadow of the cross of Castile and Aragon a great portion of the invaluable treasure of Arab Spain was irrevocably destroyed. Although in Spain no Arabic ever was spoken again;

(*) VAN DYCK's life work, as well as his personality, won him the appellation "Al-Ḥakīm," a title equally applied in the Arabic speaking world, to a physician and a philosopher.

(1) SA'DI, LUTFI M., A Bio-Bibliographical Study of HUNAYN IBN IS-HAQ AL-IBADI (JOHANNITIUS) (809-877 A. D.), *Bulletin of the Institute of the History of Medicine*, Vol. II, p. 412, Baltimore 1934.

(2) SA'DI, LUTFI M., Reflection of Arabian Medicine at Salerno and Montpellier; *Annals of Medical History*, Vol. V, p. 216, New York, 1933.

(3) MERTON REGINALD, Cardinal Ximenes and The making of Spain, p. 77, KEGAN PAUL, London 1934.



CORNELIUS V. A. VAN DYCK
in his old age (a little over 70)

in the East, under the influence of the Koran, Arabic held its own, so that the traditions of scholarship were carried on somewhat longer; the literature, however, did not match in orginality that which was produced before the thirteenth century. From that time until the beginning of the nineteenth century, although there had been numerous medical works (a good many of them as yet unexplored), it is doubtful if any of them equalled the classical or earlier writers. A scientific and cultural stagnation ensued until the creative stimulus afforded by the foreign invasion of Egypt and Syria by BONAPARTE (1798). His conquest heralded the recent revival of learning in Egypt.

At the beginning of the nineteenth century, Egypt was a part of the Ottoman Empire. In truth, it was governed by the Mamlūks, who were constantly engaged in civil war at the expense of a populace, suffering from degrading poverty and ignorance. This state of affairs continued until the days of MUHAMMAD ALI (1805-1849)*, who not only massacred the Mamlūks, (1811 A. D.) but extended his military domination to Arabia, Syria and the Sudān.

During the régime of MUHAMMAD ALI, along with the foundation of modern schools and the translation of books, scientific Missions were dispatched to Europe, and the country, afforded an opportunity, began to yield itself to the influence of Western civilization.

"About the beginning of the nineteenth century, the practice of medicine in Egypt was undertaken by a group of men the scope of whose knowledge did not exceed the limits of certain fundamental facts, which were handed down by word of mouth and were mostly traditional." (4) A few of them enlarged their stock of medical knowledge by reading the old books written in the golden days of the Arabs (750 to 850 A. D.). It was not unusual to find that the Qānūn of Ibn-Sīnā, which was written

(*) MUHAMMAD ALI was the well-known powerful Viceroy of Egypt during the years 1805-1849 A. D. He is the founder of the Khedivial, later royal dynasty of Egypt. Seen in the light of history, his life work fully entitles him to the epithet of "The Founder of Modern Egypt."

(4) LARREY, D. J. — *Relation historique et chirurgicale de l'expédition de l'armée d'Orient, en Égypte et en Syrie.* p. 410. Paris (1803).

many centuries earlier, was the last resort of the practitioner. Minor surgery was relegated to barbers, who had not even a primary education, nor the least knowledge of anatomy.

"Bonesetters in Egypt were an ignorant lot, who played on the simplicity of the people by making them believe in their ability to heal fractures, whereas they only treated dislocations." (5) Scientific medicine, as we know it today, was at that time unknown in Egypt.

French scientists were invited to come to Egypt by MUHAMMAD ALI and were headed by the well-known French physician, CLOT bey*, who was instrumental in establishing the first school of medicine in the hospital of Abū-Zabāl, near Heliopolis (1825 A. D.). (6) A year later this was transferred to its present site at Qaśru'l-'Aynī. The first Medical mission, consisting of twelve medical students, interested in post-graduate study, left for Paris in 1832 accompanied by CLOT bey. After a sojourn of eight years and nine months in Europe they returned to Egypt and commenced the translation of Western medical literature into Arabic. In less than twenty years they had translated about seventy-six of the best known books of medicine. These early publications constituted the foundation of the latest revival in Arabic medicine up to the present time.

The situation in Syria at the beginning of the nineteenth century did not greatly differ in a social or political sense from that of Egypt. Syria was also a province of the Ottoman Empire. It was ruled by Turkish governors who were constantly at loggerheads with each other. As vassals of the Turkish Empire, however, their responsibility to the Sultan was limited to little more than paying a definite tribute levied by the weakened central

(5) CLOT BEY, *Aperçu général sur l'Égypte*, Vol. II, p. 415. Paris 1840.

(*) ANTOINE BARTHÉLEMY CLOT (1793-1868), known as CLOT BEY, was born at Grenoble, France and studied medicine and surgery at Montpellier. After practising his art for a time at Marseilles he was introduced, through a merchant, to MUHAMMAD ALI of Egypt; there he established a hospital and medical school and was appointed head of the medical administration of the country. He was given the title of bey by MUHAMMAD ALI in 1849. Later he returned to Marseilles where he died in 1868.

(6) ZAYDĀN, JURJĪ, Vol. IV, p. 24, Cairo, *Tārīkh al-ādāb al-lughat al-'arabyya*, 1914.

government in Constantinople. Concerning other internal affairs of the State, the vassal was a law unto himself.

The invasion of Syria by IBRAHIM PASHA, the son of MUHAMMAD ALI, in 1832, relieved the situation for nine years.

MUHAMMAD ALI, the first Khedive of Egypt, dreamed of inaugurating a pan-Arabic policy, the aim of which was to unite all Arabic-speaking people under his leadership. Syria would have shared in the aggregate benefit thereof, had it not been for the intervention of European powers, which necessitated the withdrawal of the armies of IBRAHIM PASHA in 1841. Following this military evacuation, a period of anarchy and chaos ensued. (7)

It should be stated, however, that a revival, both social and literary, had already started in Syria about the middle of the nineteenth century, due to the output of publications by the Būlāq printing press in Cairo, as well as to those of Constantinople. A few of the Turkish governors, appointed to rule Syria, had a taste of Western civilization and they were instrumental in propagating it in their new sphere of influence.

Islamic institutions of higher learning in Syria in the early nineteenth century consisted of a few madāris (colleges), which were usually annexed to mosques. The curriculum of the madāris comprised solely Islamic law and Arabic literature. (*) Other schools, maintained by non-Muslim sects in Syria, were largely elementary and parochial in their courses of study.

In those days there were scarcely any qualified medical men in Syria. An American missionary, Dr. HENRY A. DE FOREST, is mentioned by Commander LYNCH of the United States Navy, who visited Syria in 1847. (8) Fifteen or twenty years later, the Turkish government employed a number of inconspicuous and more or less competent foreigners, (Italians, Greeks, Hungarians and Poles), as military surgeons, health officers, municipal

(7) 'ALI bey FAHMI KĀMIL : MUṢṬAFĀ KĀMIL pasha (vol. 7, p. 148. Cairo 1909).

(*) Syria, like other Islamic countries, looked up to the Al-Azhar mosque-college in Cairo and sent its students there for centuries, to be educated under its Riwaks (loggias). Established in 972 A.D., Al-Azhar surpassed all other madrasas in Muslim countries as an educational institution. Here, also, the curriculum restricted itself to Islamic law and Arabic literature.

(8) LYNCH, W. F. (U.S.N.) *Narrative of the United States' expedition to the River Jordan and the Dead Sea.* p. 506. BLANCHARD AND LEA, Philadelphia, 1853.

physicians, etc; but before 1850, the people of the country depended almost solely on the advice of unqualified men and women. Here and there, one of these individuals was the happy possessor of an ancient medical work which had been handed down in his family, from father to son, for many generations. Others relied entirely on their own empiric experience and natural sagacity. The practice of obstetrics and the treatment of children's diseases was in the hands of midwives, who were poorly trained and unequipped for this important work. Minor surgery was performed largely by the local barber and included leeching, cupping, bleeding, the extraction of teeth, the opening of small abscesses, the treatment of ulcers and other affections of the skin, etc. Fractures and dislocations were usually dealt with by a butcher or a goatherd. The former was supposed to have some knowledge of the anatomy of bones and joints, while the latter was often obliged to practice on his flock. Because of their habit of clambering about over rocks, precipices and narrow ledges, goats are singularly liable to bad falls which often result in dislocations and broken bones. Wandering quacks, often Moors and Algerians, performed rough and ready lithotomy, couched cataracts, and treated sore eyes and other ailments.

The necessity for higher institutions of learning in Syria, at this time, was strongly felt. Beirūt, the principal coast-city of Syria, was the most accessible port d'entrée and center of Western commercial and missionary activities. Among those, through whom the flow of Western culture was quickened in that land, was young CORNELIUS VAN ALEN VAN DYCK. (*)

He was born on August 13, 1818, at Kinderhook, Columbia County, New York state. His father, Dr. HENRY L. VAN DYCK, was a country practitioner, who supplemented his professional income by farming land which he had inherited from his ancestors. They were the descendants of Dutch colonists who had settled in America some generations before. CORNELIUS' mother, CATHERINE VAN ALEN, was also of pure Dutch blood, and, during

(*) I am indebted to Dr. WILLIAM T. VAN DYCK of the American University of Beirut, Syria, for much of the material in this paper relating to the life of his father, Dr. CORNELIUS VAN DYCK.

N. B. The A in Alen is given the broad sound as in fall, call, etc.

CORNELIUS' childhood, Dutch was the language habitually spoken within the family circle.

CORNELIUS got his primary education at the village school, and later he attended the Kinderhook Academy, a good school and approximately equivalent to a modern High School. Here he was taught the elements of Latin, Greek and lower mathematics. A friend taught him some botany and helped him to collect and study the wild plants of his vicinity. He was never sent to College, but made a beginning in the direction of medical studies under his father's guidance and thus acquired a considerable knowledge of practical pharmacy and the art of dispensing. He also learned some elementary chemistry.

Dr. H. L. VAN DYCK was of a trustful disposition. About this time he made the serious mistake of signing his name to the note of a friend, as surety for a large sum of money. The "friend" proved faithless; Dr. VAN DYCK had to pay the debt and was thereby financially ruined. As a result, CORNELIUS' medical education would have come to an abrupt end, for lack of funds, were it not for the generosity of certain well-to-do friends of the family, who, at their own expense sent him to the Jefferson Medical College in Philadelphia, where he received the degree of Doctor of Medicine in 1839.

During the fourth decade of the nineteenth century, a wave of religious "revival," and of missionary enthusiasm swept over New York and the neighboring States. The young doctor was caught by it and offered his services to the association known as the American Board of Commissioners for Foreign Missions (more briefly, the A.B.C.F.M.). He was sent as a medical missionary to Syria, where he arrived on April 2nd, 1840, after a long and tedious voyage by sailing ship. Here, in addition to his medical practice, he studied theology and was ordained as a Minister of the Gospel by his brother missionaries, almost all of whom were clergymen. But ordination did not change VAN DYCK's natural tastes and aptitudes, which were manifestly for science and scholarship, and he soon became convinced of the supreme importance of liberal education as an integral part of missionary work. Accordingly, he spent comparatively little time and energy in

preaching and in sectarian propaganda, but devoted himself chiefly to teaching and to the organization of schools in different places. Nevertheless he continued his medical work, which, because of the many difficulties encountered, was exceedingly laborious.

Schools in Syria called for school books in Arabic, and of these there were very few. Accordingly, VAN DYCK set himself, very early, to the serious study of Arabic with the assistance of BUṬRUS AL-BUSTĀNŶ (*), a scholarly native of Mount Lebanon, who became his intimate and lifelong friend. Later, VAN DYCK continued his studies under the tuition of Sheikh NĀṢĪF AL-YĀZIJY (**), another learned Syrian. In this line of study, VAN DYCK was highly successful, and was soon able not only to speak Arabic fluently and correctly, but to write it with ease and thus to prepare a number of the much-needed school books. Desiring to identify himself, as fully as possible, with the life of the country, he also adopted the Syrian costume, including the red Moorish fez or tarboosh, with its thick black or blue tassel, a short jacket with tight sleeves, a close-fitting vest, very full Turkish trousers and, instead of boots or shoes, slippers of red leather much turned up at the toes. His success in all these matters was complete and came very nearly costing him his life.

On Mount Lebanon, there is always a traditional and smouldering enmity between members of the native Christian sects, on the one hand, and the Druzes (more correctly, the Durūz) on the other; and this chronic state of ill will was liable, during the earlier part of the last century, to blaze up from time to time into overt and bloody hostility. During one of these periods of active disorder, VAN DYCK rode about frequently from village to village,

(*) BUṬRUS-AL BUSTĀNĪ (1819-1883), a prominent Arabic scholar of the Maronite sect who was on friendly terms with the American missionaries then at Beirūt, and taught many of them Arabic. He adopted Protestanism, and collaborated in the translation of the Bible with VAN DYCK. He also assisted VAN DYCK in founding the college at "Abeih" Lebanon (1847 A.D.) ZAYDĀN JURJĪ *Mashāhīr al-sharq*, Vol. II p. 24, Cairo, 1924.

(**) Sheikh NĀṢĪF AL-YĀZIJY (1800-1871), a member of the Greek Orthodox sect, and eminent in Arabic letters, whose works influenced the latest literary revival. Although he knew no European language he was VAN DYCK's tutor in Arabic, and later an advisor to Dr. ELI SMITH in the latter's translation of the Bible.(VAN DYCK's helper was YŪSUF AL-ASĪR). ZAYDĀN JURJĪ, *Mashāhīr al-sharq* Vol. II, p. 9, Cairo, 1924.

attending the sick and wounded of both parties, without distinction. One day, on a lonely road, he was stopped with demonstrations of hostility by a party of armed Durūz, who mistook him for a native Christian. He tried in vain to convince them that he was a foreigner, an American doctor, and that he had under his care men of their own sect as well as members of the opposite party.

"A pretty story," said their leader, "tell it to such as are simple enough to believe it. We know that no foreigner ever spoke Arabic as you do !"

VAN DYCK was saved only by the timely arrival, on the scene, of other Durūz, who recognized him as the doctor whom they had seen, very recently, dressing the wounds of certain of their own comrades.

At about this time, VAN DYCK was writing and publishing, for the use of his pupils, textbooks on Geography, Algebra, Geometry, Prosody—all in Arabic, of course. Other works will be mentioned later.

Before 1864, the only available version of the Bible, in Arabic, both Old and New Testaments, was a faulty translation made, not directly from the Hebrew and Greek originals, but from the version commonly called the "Vulgate," which is itself a translation into Latin from the Hebrew and Greek. In the opinion of the American missionaries, a new and correct translation from the most trustworthy sources was urgently needed, and the work was begun at Beirūt in 1849 by Rev. Dr. ELI SMITH. Unfortunately Dr. SMITH's health failed in 1856, and he died in January of 1857, when only a small portion of his version was ready for publication. This included the books of Genesis and Exodus. Under these circumstances, the missionaries agreed that Dr. VAN DYCK was the man best qualified to complete the translation. To that end, he was released as far as possible from other duties, and transferred from Sidon to Beirūt in the autumn of 1857.

This work, to which VAN DYCK devoted by far the greater part of his time and energy during the next seven years, called for close and critical study, not only of classical Arabic, but of Hebrew, Syriac, and ancient Greek as well. It was of the greatest importance that the language and style of the new version should make it not merely intelligible, but truly acceptable in literary

composition and eloquence of text, throughout the Arabic-speaking world, which included at that time a population of over forty millions, with an immense geographical area, extending over Mesopotamia, Syria, Palestine, Arabia, and a very large part of Northern Africa. It was essential that the Arabic be pure, free from foreign idiom, and written in a style as clear and simple as the subject matter would permit. To help him attain his object, VAN DYCK secured the services of a learned Muslim, Sheikh YŪSUF AL-ASĪR (*), a graduate of Al-Azhar, the great Islamic college at Cairo. Briefly stated, the method of collaboration was as follows : First, VAN DYCK would write out his own translation into Arabic of the original text, Hebrew or Greek, as the case might be. Here his own scholarship sufficed to insure expression of the true sense of the original in grammatically correct Arabic; but, being a foreigner, he could not be perfectly sure that his style and idiom were entirely free from foreign taint. On these points Sheikh YŪSUF was a competent judge, and to him the manuscript was now submitted for such corrections or suggestions as he might think desirable.

When the translation reached this stage, it was set up in type, and as fast as each "form" of eight pages was composed, thirty copies were struck off. These proofs were distributed to all the missionaries in the Arabic-speaking field, to certain native scholars, and also to eminent Arabic scholars in Germany. From all of these, criticisms and suggestions were invited, and, when received, they were carefully considered before the final printing. In this manner the New Testament was finally finished early in 1860, and work was resumed on the Old Testament at the point where Dr. SMITH had left off. Here, certain special difficulties were encountered, in view of which it was deemed expedient to send Dr. VAN DYCK to Germany to confer in person with some of the eminent Orientalists in that country. Accordingly, during

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(*) Sheikh YŪSUF AL-ASĪR (1817-1889), born in Sidon, Syria, of a distinguished Muslim family. Among his well known works are treatises on Muslim Canon law, dealing with such matters as marriage, divorce, etc. He was appointed qāḍī in many centers in Syria. Despite differences in religious affiliations, he corrected and revised VAN DYCK's style of Arabic in the later's translation of the Bible. KHAIR AL-DĪN AL-ZARKALI, *Qāmūs al-a'lām*, (vol. 3, p. 1181, Arabic Press, Cairo 1928).

the summer of 1860, he visited Vienna, Leipzig, Dresden and Halle, and thus became personally acquainted with some of the men whom he had previously known only by reputation or by correspondence. One result of this journey was that soon after his return to Syria, he was elected a Corresponding Member of the Northgerman Association of Orientalists (Norddeutsche Morgenländische Gesellschaft), an honor which he justly earned and of which he was rightly proud.

Between his first arrival in Syria in 1840 and his death in 1895, VAN DYCK visited America only twice. In 1854 he went home on a furlough for about a year. This visit is noteworthy because it gave him an opportunity for the first time in his life to get some practical knowledge of microscopy. On his return to Syria, he brought with him a good microscope (judged by the standards of that time) and was the first man to use that instrument in that country for medical purposes.

His second visit to America was occasioned by the necessity for supervising the process of electrotyping the new translation of the Bible, which was finally completed in August, 1864. Arrangements were then concluded with the American Bible Society for making electrotype plates of a large octavo edition of the entire Arabic Bible, and of an edition of the New Testament *with vowel-points*. This requires explanation. Arabic, as commonly written and printed for *ordinary* purposes, shows only the consonants and the *long* vowels in each word, with here and there a mark (vowel-point) above or beneath a certain letter to indicate the *short* vowel in a syllable, when this is necessary in order to avoid ambiguity as to the pronunciation or meaning of a word. In works of great importance, such as the Qur'ān (or Korán), or of especially high quality, such as the acknowledged masterpieces of Arabic literature, *all* the vowel-points, short as well as long, must be fully indicated. This adds greatly to the difficulty and cost of printing such works, as the type for a voweled book or article has to be cast with a special form of body, to allow of the insertion of the appropriate vowel-point above or beneath each letter. Consequently, it was clear to all concerned that the making of the electrotype plates in question would require very close and highly skilled supervision, and therefore VAN DYCK was sent to New

York in 1865 to direct and control the entire operation. This task required almost all his time and energy for two years. In addition to this work, he accepted the invitation extended by the Faculty of Union Theological Seminary to give a course of instruction in Hebrew to students of that institution during the sessions of 1865-6 and 1866-7. His teaching in this important department was so successful, that upon the completion of his work at the Bible House, he was offered a permanent appointment at the Seminary as Professor of Hebrew. He declined this offer because of his devotion to the work he had undertaken in Syria, whither he returned in the autumn of 1867.

This sojourn in New York is memorable for two reasons. Firstly, from the medical point of view : During his twenty-five years in Syria, VAN DYCK had observed many varied diseases afflicting the eyes, but he had never had an opportunity to study ophthalmology under the guidance of a specialist. Now, in New York, the desired opportunity presented itself, since the New York Eye Infirmary was within easy reach of the Bible House where VAN DYCK was daily at work. It was not very difficult for him to attend the clinic at the Infirmary several times a week. Here he learned, among other things, to use the ophthalmoscope and to appreciate its value, not only to the oculist, but to the general practitioner as well. He thus qualified himself to give instruction in ophthalmology on his return to Syria. Secondly, from the financial point of view, these two years in America marked an epoch in VAN DYCK's life. The honorarium which he received for his teaching at the Union Theological Seminary took a load of care off his mind; as he himself expressed it, he was now able to "breathe freely," as regards money matters, for the first time in his life. He was forty-nine years old and he had a wife and four children to support, (a fifth was born in 1871). Hitherto his only income had been his salary as a missionary. By strict economy he had managed to live within his means, but he had never been able to accumulate a surplus, wherewith to make provision for the future. Now, he was finally able to get his life insured, and to buy the books and instruments of which he had long felt the need, but could not afford the cost.

The American missionaries had long desired an institution for

higher education in Syria, (*) and had begun, about 1863, to take definite steps towards the establishment of a college which should give in Arabic : (1) A four-year course in Arts and Sciences modeled more or less closely on the curriculum of American colleges, and qualifying for the degree of Bachelor of Arts; (2) A four-year course in Medicine and Surgery, to qualify for the degree of M.D. The institution was to be called the Syrian Protestant College, and Dr. DANIEL BLISS had been appointed by the Mission to visit America and Great Britain in order to arouse interest in this project, and to raise money for its realization. The Department of Arts and Sciences was opened in 1866, and the Medical Department followed a few years later. At that time there were very few men competent to teach any branch of medicine in Arabic, and VAN DYCK, as one of the best known of those few, was invited to take the chair of Internal Medicine and General Pathology, to which Ophthalmology was provisionally attached. He accepted this invitation and agreed to undertake, also provisionally, the duties of Professor of Chemistry, until a competent man could be secured for this chair. Later, he also undertook to teach Astronomy and Meteorology after he was relieved of Chemistry.

The Syrian Protestant College was organized and endowed as an independent institution, having no organic connection with the Syrian Mission, although the Mission was largely represented on its Board of Managers. As a member of the Mission, VAN DYCK continued to supervise the publication of new editions of the Bible, or of portions thereof. He was also Director of the Mission Press and Editor of the weekly missionary paper known as *An-Nashrah al-Usbū'iyeh*. As a teacher, it was necessary for him to write and publish text-books in the Arabic language, on Chemistry, Internal Medicine, Physical Diagnosis, Trigonometry and Astronomy. These were published, at intervals, when the occasion required or when his multifarious duties permitted. At first, most of the students were obliged individually to copy

(*) The Syrian Protestant College, which opened its doors to only forty-six students in 1866, gradually grew to have thousands of students and several departments of higher studies. In recognition of this growth and development, the authorities of the State of New York of the United States of America, in 1921, bestowed on the college the title of The American University of Beirūt, by which it is now known.

the manuscripts of the works which were then in the course of preparation by their teachers.

He was also greatly interested in the history of Arabic medicine. In 1872, he published AR-RĀZĪ's (850-932?) classical treatise on smallpox and measles, with critical footnotes, and he added a modern account of these same diseases. (9)

To teach Medicine and Surgery without a hospital was obviously out of the question. For a few years, the Syrian Protestant College maintained a small hospital of its own in a rented house; but very soon arrangements were made whereby the College undertook the medical and surgical care of the patients in a hospital belonging to the Prussian Order of the Knights of St. John. This was a good-sized, well built and fairly well equipped establishment, of which the Directress and the nursing staff were German Deaconesses of the Kaiserswerth Sisterhood. Here his numerous engagements did not allow VAN DYCK to undertake the care of in-patients, but he took his regular turn in the out-patient department, where he attended to cases of internal disease and to affections of the eye. This clinic was held twice weekly, and the number of patients was so large that he was often obliged to devote three or four consecutive hours to them, and occasionally even additional time was spent in the clinics. This was a heavy strain on a man of his age and temperament, with no other assistance than that which his students could give.

Astronomy was VAN DYCK's favorite study, the avocation in which he took special delight and found relaxation and refreshment. For many years he could not afford to get a telescope of his own, but, as professor of astronomy at the Syrian Protestant College, he had charge of a good five-inch refractor which had been presented to the institution by one of its patrons. For a number of years the College, having as yet no premises of its own, occupied one rented house after another, and during that period the telescope was committed entirely to VAN DYCK's care and kept in his house. At his own expense, he built a small wooden observatory on the roof and here he spent a good part

(9) SA'DI, L. M. The Millennium of AR-RAZI (RHAZES) (850-932 A.D.?) *Annals of Medical History*, Vol. VII, p. 66. New York, 1935.

of his leisure time, studying sun-spots by day, and the moon and the stars by night. Later, when the College had bought land and erected some buildings of its own, VAN DYCK urged the construction of an astronomical observatory, to the equipment of which he contributed as much as he could afford. Here, he inaugurated the practice of taking and recording regular meteorological observations at stated intervals each day. Before long, arrangements were made with the Turkish authorities to send telegraphic reports of these observations twice daily to the Imperial Observatory at Constantinople, whence they were communicated, in due course, to the Imperial Meteorological Bureau at Vienna. Later, after he had retired entirely from teaching, VAN DYCK bought a telescope of his own, housed it in a small observatory in his garden, and there enjoyed the consolation of his favorite pursuit during his last years.

In 1882 various considerations decided VAN DYCK to resign his professorship in the Syrian Protestant College. Consequently, his connection with St. John's Hospital came to an end, but his activity in the Syria Mission was not affected by this step, since there was no organic connection between the College and the Mission. Several months later, he accepted an invitation to conduct an out-patient clinic, twice weekly, at the native Orthodox Greek Hospital of St. George, where he continued to work for several years, as long as his health would permit. Retirement from teaching gave him more leisure than that to which he had been accustomed. In order to occupy his time and divert himself, he began to write in Arabic, and eventually published, a series of brief elementary books on scientific subjects. They were modeled to some extent on a series of English "Science Primers," which he had seen. VAN DYCK's primers were very well received by the public, became quite popular, and were used for a good many years in a number of schools. The series included the following subjects : General Introduction to Natural Science; Physics; Chemistry; Physical Geography; Geology, and Astronomy. He wrote a single small volume dealing with each of these subjects.

April second, 1890, was the fiftieth anniversary of VAN DYCK's arrival in Syria. A large number of his friends, both Syrians and foreigners, took the opportunity to celebrate the occasion and to

express their appreciation of his life and work by means of complimentary addresses and presents of various kinds, including a substantial sum of money which had been subscribed by members of various sects and communities throughout the country. The next five years were uneventful, but during the autumn of 1895 there was a very severe outbreak of enteric fever in Beirūt, due to accidental pollution of the city's water supply. VAN DYCK sickened with the disease towards the end of October and died on the 13th of November, at the age of seventy-seven years and three months. The immediate cause of his death was profuse intestinal haemorrhage.

Unquestionably, CORNELIUS VAN DYCK made a lasting impression on the people of Syria and the adjacent Arabic-speaking countries. In view of his natural versatility, and the great diversity of his occupations, there is room for considerable difference of opinion as to the comparative value of his varied activities. It is quite natural and, indeed, it is to be expected that missionaries, and others who are much interested in evangelical work, should attach the greatest importance to the translation of the Bible, whereas philanthropists will lay more stress on what he accomplished as a physician for the relief of human suffering, inasmuch as a large part of his work was for the benefit of the poor who attended his clinics.

Over forty years have now passed since VAN DYCK's death, and this lapse of time makes it possible for one to view his life and work in a true perspective without the distortion which is almost inevitable when the spectator stands too close to the object of his contemplation. We can now reach a fairly trustworthy estimate of the durability of the impression he made during his lifetime. It should be clearly understood at once that VAN DYCK was not a scientific investigator and never laid claim to originality in research. He was, however, a pioneer in Syria in the field of modern medicine and other sciences; i.e., he went before and thereby showed the way to others who followed. He brought into the country which held his interest, certain fundamental educational principles and certain vital types of knowledge derived from other lands but rehabilitated in Arabic form. Although he never added to scientific knowledge by original

investigations, his professional skill, which was conspicuous in his time, is still remembered by many, and is inseparably associated with the charm of his sympathetic personality, which, without doubt, often did his patients as much good as his medicinal treatment. Perhaps he did not *cure* many diseases, in the strict sense of the word; but unquestionably he relieved much suffering, and he was preëminently successful in cheering, encouraging and comforting, not only the patients themselves, but their families and friends as well, which is often quite as important.

Granting all this, it is certain, nevertheless, that VAN DYCK's greatest and most enduring service to the people of Syria lies in the impetus he helped to give to their intellectual and spiritual renascence, by his daily conversation, teaching and published writings. In this manner, he brought many young men to a realization and appreciation of the value of natural knowledge, i.e., of the physical and natural sciences, and to recognition of the intimate bearing of such knowledge on everyday life. Moreover, he quickened in them, by his own example, a movement towards liberality in thought, and towards a broad and sympathetic humanity in outlook and purpose. He showed them that true religion does not consist in sectarian zeal, nor in ecclesiastical fervor, nor in theological orthodoxy of doctrine, but in an earnest desire to amend the condition of one's fellow men by doing justly, and loving mercy, and walking humbly among them, in that upright humility which is wholly consistent with manly self-respect.

Another interesting question has sometimes been debated : Did VAN DYCK, a foreigner, exert any appreciable influence on the literature, the "revival of letters," in the Arabic-speaking world? Up to the middle of the nineteenth century, or thereabouts, most of the Arabic text-books, available for students on any subject, were written in a style so condensed, and not unfrequently, in phraseology so unfamiliar, as to obscure the meaning of many passages. Consequently, voluminous notes and commentaries, written by learned specialists, were required for the elucidation of the classical texts, and, as a rule, still further expositions by a competent teacher were needed by the average student. In this respect, VAN DYCK's educational books were epoch-making, and it was with special reference to them that a learned Muslim Sheikh, of the College of Al-Azhar in Cairo,

gave an answer to the question above mentioned. Some years after VAN DYCK's death, this Sheikh, in conversation with VAN DYCK's daughter, said to her : "Your father taught me, by his published writings, that it is possible to write good Arabic, correct in grammar and in idiom, in a style so simple and so clear as to be easily understood by any intelligent reader, whether learned or unlearned."

The treatment of a difficult subject in such a manner as to make it intelligible to the multitude, is commonly called (somewhat contemptuously) "popularization." Better suited to the matter here and now under consideration, is the phrase used some years ago by JAMES HARVEY ROBINSON (author of *The Mind in the Making*, etc.) as the title of a small but highly interesting and instructive book, *The Humanizing of Knowledge*, i.e., the endeavor to deal with the results of the labors of highly trained specialists in such a manner as to bring them within the comprehension of fairly well informed persons of average intelligence. This may be accomplished (but only by a thoroughly competent writer or teacher) by describing the results obtained by such specialists briefly, clearly and in simple, untechnical language; and by explaining the bearing of such knowledge on the everyday life and current thought of the generality of mankind. This is exactly what VAN DYCK aimed at : to *humanize knowledge* for the benefit of readers of the Arabic language.

(Detroit, Michigan). LUTFI M. SA'DI

EDITORIAL NOTE

A bibliography of Dr. CORNELIUS VAN DYCK's writings may be found in the *Iktifā al-qunū' bimā huwa maṭbū' min ashhar al-tālīf al-'arabīyat...* compiled by his son EDWARD ABBOTT VAN DYCK (Cairo 1896, by index) and in YŪSUF ILYĀN SARKĪS : *Mu'jam al-maṭbū 'āt al-'arabiyya wal-mu'arabba* (Cairo 1928-30, col. 1462-65). SARKĪS mentions sixteen different works, some of which are represented by more than one edition. Thanks to the courtesy of the Trustees of the British Museum, I am privileged to reproduce with Dr. SA'DI's article the title pages of a few of Dr. VAN DYCK's books.

Dr. CORNELIUS VAN DYCK's publications were all of them

in the Arabic language, and of three kinds : (1) Translation of the Bible, sermons and apologetics. (2) Translations of three other works the most famous of which being *Ben-Hur, a tale of the Christ* by General LEW WALLACE (Cairo 1896, reprinted in Beirūt 1922). (3) Scientific treatises, the most important of which are represented by the facsimiles included in this article.

He edited AL-RĀZĪ's famous treatise on measles. I have not seen that edition which I only know of through SARKĪS (no. 14 of his list).

According to a document kindly procured by Dr. BAYARD DODGE, president of the American University of Beirūt, certain scientific writings are still unpublished.

The large building given to the American University by the Rockefeller Foundation to house the laboratories and classrooms for the first two years of the medical school, was named after Dr. CORNELIUS VAN DYCK. Much information on him may be found in the *Reminiscences of Daniel Bliss*, written by Dr. FREDERICK JONES BLISS (New York, 1920). Finally we owe to one of Dr. VAN DYCK's sons, WILLIAM THOMSON VAN DYCK the following notes. GEORGE SARTON

Supplementary memoranda concerning C. V. A. Van Dyck

PERSONAL CHARACTERISTICS

Sincerity, integrity, open-mindedness, generosity, kindliness : these were VAN DYCK's outstanding qualitites in private life as well as in the discharge of his professional duties and obligations. An old Arabic adage declares that " money matters are the touchstone of human character." Tried by this test, V.D. was distinctly above the average of his fellow men. The hard experience of his early years (in consequence of his father's heavy pecuniary losses) inured him to self-denial and taught him the value of money as a means to many desirable ends. He abhorred debt and avoided it as most men abhor and avoid a venomous snake. No member of his household was permitted at any time or on any pretext whatever, to buy on credit any article, however small its value, nor to run up an account with any shopkeeper or tradesman. " *If you cannot pay on the spot for what you want, you must do without it* " : this was his inexorable

rule. On the other hand, he was exceedingly generous—sometimes even unwisely generous—to any person whom he believed to be really deserving of help, or to any cause which he deemed worthy of support. To keep all promises, to meet all obligations, to perform all undertakings, promptly, faithfully, whole-heartedly, and to the very best of his ability: these were, for him, commandments as sacredly binding as any of those formally enumerated in the Decalogue.

As a young man, he was by nature impatient, impetuous and hot-tempered; but the discipline of life, its disappointments and its sorrows, so modified his character in these respects that, by the time he reached middle age, he had become patient, forbearing and self-restrained under all ordinary circumstances. Nevertheless, under strong provocation he could still break out vehemently, especially against any person guilty of tyranny, cruelty, or fanatical intolerance. "*Intolerance cannot be tolerated*," was one of his favorite maxims. Occasionally, when his indignation was aroused because of serious injustice done to the poor or weak by the rich or strong, he would flare up fiercely and speak his mind in no measured terms to the offender. But he never bore malice.

He had a very keen sense of humor. On the strength of this fact, innumerable amusing anecdotes have been told of him, almost all of which, as commonly repeated, are fictitious. The truth is, that his humor consisted chiefly in the striking aptness of his remarks to the particular occasion on which they were uttered, the special circumstances by which they were evoked. For this reason, a quick retort, or an apt quotation, or a homely phrase, would come from his lips with a peculiar flavor, a spicy tang, as irresistible to his hearers as it is indescribable to others.

Wife and Children

In 1842 (i.e., at the age of 24), Cornelius Van Dyck was married to Julia Abbott, whose deceased father had been British Consul at Beirūt. Mrs. Van Dyck survived her husband nearly twenty-three years, dying in 1918 at the age of ninety-one. They had six children: three sons and three daughters, namely:

(1) Henry Laurence: born 1843, died 1883. He was a man of business.

(2) EDWARD ABBOTT : born 1846. As a young man, he taught English for a short time at the S.P.C. Later, he entered the American Consular Service for some years. Having an excellent knowledge of Arabic, both classical and colloquial, he served in 1884, during the British expedition for the relief of Khartoum, as Chief Interpreter under Sir CHARLES WILSON, who was head of the Intelligence Department of the Army commanded by Lord WOLSELEY. After that, he was employed for many years as a teacher in the Department of Translation of the Egyptian Government's Law Schools in Cairo. He is now (1936) living in retirement in one of the suburbs of Cairo.

(3) ELLEN MARIA : born 1848, died 1849, aged eighteen months.

(4) ELIZA ANN : died 1936. Unmarried. She inherited many of her father's personal qualities and tastes, being specially interested in astronomy, botany, literature and philanthropy. Between her 25th and 40th years, she taught, at various times, at the American Mission's School of Girls, Beirūt, and in British missionary schools in Damascus and on Mount Lebanon.

(5) WILLIAM THOMSON : born 1857. Studied Medicine at the S.P.C. from 1875 to 1878; then at University Medical College, N.Y., from 1878 to 1880, when he took the degree of M.D. From 1880 to 1882, Lecturer on Materia Medica and Hygiene, S.P.C. From 1883 to 1914, general practitioner, Beirūt and Lebanon. From 1915 to 1920, Lecturer on Hygiene, Physiology, and other subjects, S.P.C. From 1920 to 1927, Professor of Zoology, A.U.B. Since, 1928, retired as "Professor Emeritus."

(6) FLORENCE KATHERINE : born 1871. Married in 1898 to JOHN C. BUCHER (now of Peekskill, N.Y.). Died in 1908.

C.V.A.V.D. was an exceedingly tender and affectionate father, always deeply solicitous for the welfare of his children; but he never spoiled them by over-indulgence nor by laxity in discipline. Disobedience, or disrespect, he would never endure. He very rarely punished a child; an expression of displeasure was quite enough to correct any ordinary misdemeanor, for his children revered and adored him. He always interested himself warmly and sympathetically in their pleasures and pursuits; and to win his approval was, for them, the greatest happiness.

Beirūt, June 7th 1936. W. T. VAN DYCK.

FIG. 1
Kitāb al-mir'āt al-waḍiyyat fī-l-kurrat al-arḍiyyat. Textbook of geography (iv + 474 p., Beirūt, 1852). The ms. was completed on Feb. 12, 1852.

FIG. 2
Kitāb kashf al-qinā' 'an aḥwāl al-aqālīm wal-biqā'. Persian translation of VAN DYCK's Textbook of geography entitled Kitāb al-mir'āt al-waḍiyya, by Fakhr al-dīn ibn Abī al-Qāsim Gulpāīgānī (220p., lith., Bombay, n.d.).

Beirût, 1852). The ms. was completed on Feb. 12, 1852.

geography entitled Kitāb al-mir'āt al-waḍiyya, by Fakhr al-dīn ibn Abī al-Qāsim Gulpāīgānī (220p., lith., Bombay, n.d.).

كتاب
الروضة الزهرية
في
الاصول الجبرية

FIG. 3
Kitāb al-rauḍat al-zahriyyat fīl-uṣūl al-jabriyyat. Textbook on algebra (252 p., Beirût, 1853). The fair copy of the Ms. was completed on January 21, 1853.

كتاب
في الاصول الهندسية
وهو مشتمل على
كتب اقليدس الستة
ومضافات في مربع الدائرة
وهندسة الاجسام
واصول قياس المثلثات المستوية والكروية
ترجمة
كرنيليوس فان ديك
١

FIG. 4
Kitāb fī-l-uṣūl al-handasiyyat. Elements of geometry, including books I-VI of EUCLID, plus chapters dealing with the squaring of circles, solid geometry, and the elements of plane and spherical trigonometry (312 p., Beirût, 1857). It is called a " translation " but the original book is not named. The Ms. was completed at Ṣaidā on August 14, 1857.

كتاب
العهد الجديد لربنا
ومخلصنا يسوع
المسيح

قد نُرجم حديثاً من اللغة اليونانية

FIG. 5
New translation of the New Testament from the Greek by ELI SMITH and C. VAN DYCK (Title page of first edition).

رؤيا ٢٢ — ملاك كل باطل حسب عبارة — الكتاب

نحم ٢٢ ٢

٢٠ او انها انا آتي سريعاً واجرتي معي لاجازي كل واحد كما يكون
عملهُ. ١٣ انا الالف والياء. البداية والنهاية. الاول والآخر. ١٤ طوبى
للذين يصنعون وصاياهُ لكي يكون سلطانهم على شجرة الحيوة
ويدخلون من الابواب الى المدينة. ١٥ [اذ] خارجاً الكلاب والسحرة
والزناة والقتلة وعبدة الاوثان وكل من يحب ويصنع كذباً
١٦ انا يسوع ارسلت ملاكي لاشهد لكم بهذه الامور عن الكنائس. انا
اصل وذرية داود. كوكب الصبح المنير. ١٧ والروح والعروس يقولان
تعال. ومن يسمع فليقل تعال. ومن يعطش فليأت. ومن يرد فليأخذ
ماء حيوة مجاناً
١٨ لاني اشهد لكل من يسمع اقوال نبوة هذا الكتاب ان كان احدٌ
يزيد على هذا يزد الله عليه الضربات المكتوبة في هذا الكتاب. ١٩ وان
كان احدٌ يحذف من اقوال كتاب هذه النبوة يحذف الله نصيبهُ من
سفر الحيوة ومن المدينة المقدسة [ومن] المكتوب في هذا الكتاب
٢٠ يقول الشاهد بهذا نعم انا آتي سريعاً. آمين. تعال ايها الرب
يسوع
٢١ نعمة ربنا يسوع المسيح مع جميعكم
آمين

٢

ن قادمين بسلمي بايام ص ١٨:٢ ن انا الشهد ن طيبا ن ثمرة ن او المكتوبين
ن التوب ن ج جميع القديسين

طُبع في بيروت وكان الفراغ من طبعهِ في شهر تشرين الثاني سنة ١٨٦٥
مسيحية

FIG. 6
Last page of the New Testament newly translated by ELI SMITH and C. VAN DYCK. The first printing (510 p.) was completed in Beirūt in November 1864 (see colophon). The printing of the Old Testament newly translated from the Hebrew (iv+1534 p.) was completed in the following year.

the Old Testament newly translated from the Hebrew (iv+1534 p.) was completed in the following year.

اصول

الپاثولوجيّة الداخلية الخاصة

اي مبادي

الطب البشري النظري والعملي

تاليف

كرنيليوس فان ديك

Van Dyck (C.V.A.)

K

طبع في بيروت سنة ١٨٧٨

FIG. 8
Uṣūl al-pāthūlūjiyyat al-dākhiliyyat al-khāṣṣat. Elements of special internal pathology (xiv+1056 p., Beirūt 1878).

K

Van Dyck (C.V.A.)

اصول الكيميا

تاليف كرنيليوس فان دَيْك

طُبع في بيروت سنة ١٨٦٩

FIG. 7
Uṣūl al-kīmiyā. Elements of chemistry (412 p., Beirūt 1869).

كتاب

في اللوغارذمات اي الانساب
وفي مساحة المثلثات المستوية ومساحة السطوح والاجسام ومساحة
الاراضي وسلك البحر وعبارات لمساحة المثلثات الكروية
بواسطة الانساب .

تأليف كرنيليوس فان ديك

بيروت سنة ١٨٧٣

FIG. 9
Kitāb fīl-lūghāridhmāt. Treatise on logarithms and on plane and spherical trigonometry, with trigonometrical tables (352 + 156 p., Beirūt 1873).

جداول

انساب الجيوب والماسات

لكل درجة وكل دقيقة وكل ثانية عاشرة
من ربع الدائرة

FIG. 10
Jadāwil ansāb al-juyūb wal-mumāsāt. Tables of logarithms of sines and tangents. Being the second part (156 p.) of the Treatise on logarithms of 1873.

Beirūt 1873).

on logarithms of 1873.

مختصر تاريخ علم الهيئة

ان علم الهيئة علم مدارهُ الاجرام السموية اي الشمس والسيّارات واقارها والثوابت وذوات الاذناب وهو ينقسم الى قسمين نظري وعملي امّا الاوّل منها فيصف لنا الاجرام السموية ويخبرنا ببعدها عن الشمس وبحركاتها وفصولها السنوية وهيئاتها اما القسم الثاني فيبحث عن كيفيّة رصد تلك الاجرام

ان هذا العلم اقدم العلوم وقبل ان رصد النجوم ابتدأ من خلق الانسان لانهُ قبل وجود التواريخ التي يُوثَق بها عن هذا العلم ذُكِرَت روايات وتقاليد عن حوادث فلكية متداولة بين السُنن العامة وهي مستترة تحت رداء اسرار تلك الروايات . وفي مراجعة تاريخ هذا العلم نذكر فقط بعض الحقائق الواضحة التي تبيّن لنا قدمتهُ

ان اهل بلاد الصين يتفاخرون بالرصود الفلكية حتى ان سلطانهم الى الآن يدّعي بان سلفاءهُ كانوا من اهل السماء ولذلك يسمّي نفسهُ ابن الشمس وعندهم تاريخ اقتران اربعة

Fig. 11
Mukhtaṣar tārīkh 'ilm al-hī'at. Abridged history of astronomy; elementary astronomy (181 + iii p., Beirūt 1874?). This is the first page of the text, there being no title page in the British Museum copy.

اصول

علم الهيئة

Van Dyck (C. A.)

تأليف كرنيليوس فان ديك

طُبع في بيروت سنة ١٨٧٤

Fig. 12
Uṣūl 'ilm al-hī'at. Elements of astronomy (viii + 288p., 9 pl., Beirūt 1874).

Is there progress in mathematical discovery and did the Greeks have analytic geometry?

In a recent discussion by JULIAN COOLIDGE (1), whose competence to discuss the progress of analytic geometry can not be questioned, the thesis is advanced that the Greeks had analytical geometry. This question is vitally connected with the more fudamental question : Is there progress in the historical development of mathematical science?

For some 1300 years some scholars have confused the beginnings of all mathematical science with the amazing developments made in Greece. The mathematics of Egypt and Babylon was long regarded as trivial and of no demonstrable influence on the progress of Greek science. The recent overwhelming additions to our knowledge of the mathematics of Egypt and Babylon have even yet not completely destroyed the Greek illusion. Witness the statement in *Archeion* by so eminent a modern historian of science as GINO LORIA (2), denying to Egyptian and Babylonian contributions the name of scientific achievements.

Even the undisputable contributions of the Hindus are questioned; often the arguments of KAYE, whose absolute unreliability on these questions has been demonstrated (3), are revived as established facts instead of real fiction.

It may seem not pertinent to the question raised to introduce the Hindu and the Babylonian. However, the Analytic Geometry

(1) JULIAN COOLIDGE, The origin of analytic geometry (*Osiris*, Vol. 1, 231-250, 1935).

(2) GINO LORIA, Sur l'arithmétique babylonienne, *Archeion*, XVIII, p. 63.

(3) Notably by W. E. CLARK in his scholarly work on ARYABHATA (*Isis*, 15, 173, 1931).

proper as a modern tool hinges upon the achievements of the Greeks and the Hindus, as utilized and combined by the Arabs, and as systematized and elaborated by the Europeans, notably the Austrians, Italians, and the French, particularly VIETA, all of these developments making possible modern mathematics. Furthermore, the Greek developments, precisely in the ideas relating to conic sections and the application of areas, are now directly connected with the Babylonian and even Egyptian achievements.

COOLIDGE implies that historians regard the analytic geometry as springing "full-armed from the head of DESCARTES." This view can not be sustained since on even so minor a point as the actual use of negative coordinates DESCARTES never made the advance. COOLIDGE himself gives many further developments not found in DESCARTES. The germinal idea is there in DESCARTES, but the application is not made.

The simultaneous discovery by FERMAT of the methods of analytic geometry demonstrates clearly that the ideas "were in the air" and that the necessary developments having been made, the culmination in analytic geometry was possible. FERMAT approached far more closely to the modern method except that he unfortunately continued the particular symbolism of VIETA which was not so well adapted to print and pen.

In what does the analytic geometry consist? The crucial importance of the VIETA literal symbolism, involving algebraic methods for the demonstration of geometrical properties, is not mentioned by COOLIDGE. The analytic geometry consists in the application of algebraic methods to geometrical problems by means of a generalized algebraic symbolism. The use of parameters and representation by letters of constants as well as of variables is essential in the development of analytic geometry.

If the analytic geometry was already in the hands of the Greeks, then the calculus, both differential and integral, "sprang full-armed" from the heads of NEWTON and LEIBNIZ. We might appropriately add here the calculus not only of NEWTON and LEIBNIZ, but also of BARROW, CAVALIERI, WALLIS, possibly the Hindus, and many others. Indeed neither analytic geometry nor calculus had this miraculous development; both emerged gradually over centuries. No mathematical science has sprung

full-armed from any head but every crucial development in the progress of mathematical science has been made upon the basis of intellectual developments reaching back to and connecting directly with the most ancient documents touching mathematical ideas.

DESCARTES' analytical geometry, by the symbolism employed and the algebraic methods involved, made possible the calculus both of NEWTON and LEIBNIZ. ARCHIMEDES had the fundamental summation concept of the integral calculus more truly and precisely than APOLLONIUS had the vital concepts of the analytical geometry; but the method was lost because there was not adequate preparation of the students of mathematics in ARCHIMEDES day for appreciation of this method.

The genius is one whose superior mind fits new discoveries to the achievements of colleagues and continuators; when the genius makes a jump, as ARCHIMEDES did in an integration process, the achievement remains sterile because it cannot be used. ARCHIMEDES himself believed that his mechanical method was the greatest innovation which he had effected, but he did not appreciate that the way had not been adequately prepared.

There is here, indeed, an apparent contradiction in that ARCHIMEDES by a stroke of " genius, " obtained the area of a parabolic segment and the volume of the sphere by calculus methods, but in these methods ARCHIMEDES was in advance of his Age. The jump was too great and the achievement remained sterile. In geometry, in hydrostatics, in mechanics, and in many other developments, ARCHIMEDES led where others could follow; on this material ARCHIMEDES, while distinctly superior to his contemporaries, was essentially " part and parcel " of his Age.

The problem in whose discussion DESCARTES arrives at the analytic geometry is that of the " three and the four line " locus. Slightly simplified this may be formulated : to find the locus of a point which moves so that the product of the distances from two fixed lines is proportional to the square of the distance from a third line or proportional to the product of the distances from two other lines.

Only a genius like an APOLLONIUS or a COOLIDGE could solve this problem without the algebraic symbolism of analytic geometry.

EUCLID was not equal to the task and the solution was the culminating achievement of APOLLONIUS; even this solution had distinct limitations.

DESCARTES took general axes of reference, not connected with the geometrical peculiarities of any given geometrical figure, and arrived at the solution of the above problem by a method so simple that it can be given to the students in our college classes. It was the algebraic symbolism applied to the geometrical problems, with axes of coordinates independent of the particular figure, which made this possible.

What were the crucial developments which made possible the extension of the analytical geometry methods and symbolism, i.e., the VIETA literal symbolism applied to geometrical methods and figures, to the varied problems of the calculus, to physics and to astronomy? In the first place the Vieta symbolism modified by DESCARTES to the more usable small letters lent itself to slight variations to express the derivative, the differential, and the integral as in NEWTON's fluxions and in our present LEIBNIZ type of differential and integral calculus literal notations.

The development of the trigonometry of the sine function by the Hindus and the tangent function as elaborated by the Hindus and Arabs was an essential stage, making possible the application of the new methods to calculus, physics, and astronomy. The gradual introduction of the scientific rigor of the Greek geometry and trigonometry was also essential; particularly the elaboration of further trigonometric formulas and methods, notably by VIETA, facilitated the rapid progress of both analytical geometry and the calculus. In practically all of these extensions the methods of the enlarged algebra and the Hindu-Arabic arithmetic were vitally involved.

The rectangular coordinates with the polar coordinates connect the analytical geometry with trigonometry; the coordinates applied to the complex plane, for the representation of complex numbers as points and as vectors, ties in another rather late development, but vital in many developments of the higher mathematics. In the trigonometry we have functions which recur and make possible the application of mathematics to repeating processes inevitably connected with enjoyment of modern conveniences.

Wherever there is wave motion the trigonometric functions and methods are indispensable. The analytic geometry of DESCARTES made definite provision for these steps and no such development exists in the Greek geometry.

In turning from the beautiful problems of pure geometry to the mundane problems of physics; in directing the application of the calculus to the study of moving objects, to the vibrating strings of D'ALEMBERT and to wave motion and light and electricity, the seventeenth and eighteenth centuries made possible the twentieth. But it must be remembered that these applications were made possible by the trigonometry, the algebra, and the analytic geometry. In these applications and elaborations the mathematical achievements of all the ages past are crystallized.

In particular, looking back to the ancient Babylonians we see that the varied mathematical developments found in these earliest documents, viz., in numbers, in squares and cubes, in series, in the consideration of a changing rectangle with constant perimeter and some function of the sides and area as given, in the linear, quadratic and cubic problems, and in strange inheritance problems, all of these ideas bore rich fruit. We see clearly that the Babylonian achievements either influenced the Egyptian or vice versa; the problems are too similar to be accidental. The Greek developments took many of the problems of Egypt and Babylon, almost with the precise mathematical phraseology, as in the problems of EUCLID's Book of the Data; and as NEUGEBAUER has recently shown (1), the Greek progress in understanding the conic sections hinges upon the Babylonian achievements.

The Greeks developed the logical geometry, culminating in EUCLID; these rigorous methods were further cultivated in mechanics, hydrostatics, in the study of conic sections, and in the measurement of volumes and areas, and in the study of series and numbers as well as in astronomy, by such men as EUDOXUS, ARCHIMEDES, APOLLONIUS, and DIOPHANTUS.

The Hindu developments introduced the powerful instrument for calculation, the numeral system with a zero, an algebraic

(1) Zur geometrischen Algebra, *Quellen und Studien*, B, Vol. 3, pp. 245-262.

symbolism elaborated by the Arabs, and a trigonometry of sines and cosines also elaborated by the Arabs, with a geometrically used shadow function further developed by Arabs and Europeans. The Arabs made sufficient progress in algebra to be able to reduce the trisection of an angle to a cubic equation and the construction of the regular polygons of seven and nine sides to the cubic, as well as the pentagon to a biquadratic reducible to quadratics. The Arabs combined Hindu material and Greek methods in their trigonometry.

Those who believe the Arabs used no algebraic or even arithmetical symbolism are misled by the fact that the transcripts of the ancient documents were made by scribes, paid by the line, who were not mathematicians and calculators. The actual method of the ancient Arabs is revealed to us only in such fragmentary details as the peculiar notations in fractions (1), together with the by no means fragmentary extensive tables to what amounts often to nine significant figures whose computation is not conceivable without the use of the Hindu-Arabic notation. / Mathematical science owes its birth and its development to the fact that man reasons and is able to reduce his reasoning to language and to writing for the instruction of future generations. As KORZYBSKI phrases it, man is a "time-binder," the only living organism able to profit by the achievements and the mistakes of its predecessors. The attempt to explain the universe, to understand the universe and life, inevitably involved the study of number and form. When this study was put into systematic form in writing, possibly even when such results were first verbally stated, we have the beginnings of science. The solution of numerical problems involving given relationships was a major achievement in science. VIETA's literal symbolism for constants and variables of the late sixteenth century of the Christian Era was absolutely essential to the rapid progress of mathematical science; the Babylonians progressed in the solution of highly complicated algebraical problems very far yet no historian even remotely suspected the developments now revealed. The achievements of the Babylonians and the Egyptians and Hindus are

(1) H. SUTER, Das Rechenbuch des ABU ZAKARIJA EL HASSAR, *Bibl. Math.*, Vol. 2, third series, particularly pp. 19-27.

scientific in the highest sense leading to an amazingly clear understanding of the motions of the heavenly bodies and, far more, to real comprehension of the basic ideas of number and form and the universe in which we live.

Ann Arbor, Mich. L. C. KARPINSKI.

The Secrets of Hermes

(An alchemical text reproduced from MSS Bern Stadtbibliothek B. 44, fols. 231r-233v or 232r-234v, and Vatican Palatine Latin 1335, fols. 96r-99r).

In 1930 in a brief note in *Isis* entitled, "Seven Salts of Hermes," (1) I reproduced a short passage enumerating seven salts corresponding to the planets from an English manuscript (Oxford, All Souls College 81, 15th century, fol. 19r) of the alchemical work which seems to have commonly been called *The Secrets of Hermes*. I now propose to give the text more fully from two continental manuscripts, so far as the seven planets, metals and salts are concerned.

Whether this passage is a complete text in itself or merely the introduction to *The Secrets of Hermes* seems uncertain. In the All Souls manuscript the text breaks off before even this much has been completed (2). In other English manuscripts it would appear from Mrs WALEY SINGER's catalogue that, as in the case of our Bern manuscript, only a page or so of instructions as to use of the salts in alchemical transmutation has been added (3). But in our Vatican Palatine manuscript chapters numbered up to 87 (4) follow the discussion of the seven planets, metals and salts. It will be noted, however, that in this manuscript the title is not *The Secrets of Hermes* but *The Secrets of Master James*

(1) *Isis* No. 43 (Vol. XIV, 1), May, 1930, pp. 187-88.

(2) COXE's Catalogue of the MSS in Oxford Colleges and DOROTHEA WALEY SINGER, *Catalogue of Latin and Vernacular Manuscripts in Great Britain and Ireland*, No. 37, vol. I, 1928, p. 44, are mistaken in representing *The Secrets of Hermes* as extending over fols. 18v-52v and 17. Actually it seems to break off with fol. 20v. Beginning with fol. 21r we have a different writing and kind of page, presumably from what was once another manuscript, while at fol. 26 opens a work on natural questions which is not even alchemical.

(3) It will be noted that the Explicit given by Mrs. SINGER at p. 43 is the same as that of our Bern manuscript.

(4) The actual numbering begins only with Capitulum 3^{m} on fol. 99v, but two previous paragraphs can be distinguished on fol. 99r after the discussion of *Sal elembroth* has concluded.

According to Hermes. Nor are the three paragraphs added to our text in the Bern manuscript at all like the early numbered chapters of the Vatican Palatine manuscript, which seem to have little connection with the preceding text. But the discussion of the planets, metals and salts is roughly identical in both. The variations are, however, sufficient to make it advisable to give each version separately rather than attempt to combine them into a single text. Both our manuscripts are alchemical collections or miscellanies of the fifteenth century (5).

The text constitutes not only an interesting effort to relate seven salts with the seven metals and seven planets but also a notable attempt to express chemical valencies and action in terms of qualities and degrees instead of our modern atomic weights and groupings. Besides the four primary qualities of hot, cold, wet and dry—it will be noted that while five of the seven metals are cold rather than hot, no salt is cold—others are introduced denoted by the terms white, obscure, fixed, porous and ponderous.

TEXT FROM BERN STADTBIBLIOTHEK
B. 44 fol. 232 (231) recto.

Secreta Hermetis philosophi inventoris metallorum secundum mutacionis naturam.

Sciendum quod vii sunt planete secundum cursum quorum omnia inferiora reguntur et sapiunt naturam eorum secundum magis et minus : Saturnus, Iupiter, Mars, Sol, Venus, Mercurius et luna. Et sicut vii sunt planete, sic vii sunt metalla que sapiunt naturam eorum sicut ab eis descendunt. Nomina autem metallorum sunt Blumbum (6), quod a philosophis nominatur Saturnus, quia ab eo suam trahit naturam; Argentum vivum, quod Mercurius appellatur; Stannum, Iupiter; Ferrum, Mars; Aurum, sol; Argentum, luna; Eramen vel Eramentum, Venus. Tu qui vis naturam metallorum transmutare vel unius naturam in alteram primo considera naturam planetarum per quam scire

(5) The contents of Vatican Palatine Latin 1335 have been outlined by me in an article, " Alchemical Writings in Vatican Palatine and Certain Other Continental Latin Manuscripts," *Speculum*, XI, 3 (July, 1936), pp. 370-83. See especially pp. 375-76.

I expect to treat of the other contents of the Bern MS in a subsequent article.

(6) For " Plumbum."

poteris naturam metallorum. Postea considera naturam metallorum iuxta naturam planetarum que primo scire oportet cognita que necessaria erunt ad transmutationem metallorum.

Et nota quod vii sunt magistri sicut vii planete et vii metalla qui magistri habent facere transmutationem metallorum et dare colorem albedinem porositatem et fixationem. Hy magistri sunt sal armoniacus qui fit de sanguine hominis, sal commune ut plenius inferius dicemus, sal gemme et est coloris cristallini et fit ex sale alkali et sale communi et aqua maris vel salsa ut inferius dicemus. Sal nitrum fit ex sale gemma et sale alkali. Sal talci fit ex sale nitri et sale alembroc ut inferius distinguemus. Sal commune fit ex aqua salsa vel maris. Sal alkali fit ex sale gemma et vitro bene contrito. Isto sale multi utuntur vitrarii. Sal alembroc fit de v herbarum succis. Et istud est quod appellavi magistrum (fol. 232v) magistrorum. Nam mirabilia facit de mercurio lunam et solem purissimum.

Viso quot sint planete quot metalla et quot magistri restat videre naturam eorum. Saturnus est frigidus et humidus, albus cum obscuritate, tamen et fixus cum quadam mollitie et quam multum. Et ab isto planeta suam trahit naturam metallinam illud quod nominatur blumbum quod sic a philosopho appellatur. Videamus igitur naturam ipsius blumbi per capitulum ad hoc ut ipsius naturam et colorem scias conservare et in naturam alterius metalli transmutare. Blumbum igitur est frigidum, humidum et album sed obscurum, fixum, non porosum. Est autem frigidum in 3^{o} gradu, humidum in 2^{o}, album in 3^{o}, fixum in 2^{o}. Et nota quod tantum sunt iiii gradus in metallorum naturis secundum Hermetem. Mercurius est frigidus et humidus cum siccitate, tamen albus, liquidus, mobilis, ponderosus, a qua planeta suam habet naturam metallinam, illud quod vocatur argentum vivum, quod de sui natura est frigidum et humidum cum siccitate, album, liquidum, non porosum, ponderosum valde. Habet dare siccitatem omni rei vitam habenti. Iupiter est frigidus et siccus, albus, fixus, ponderosus, porosus, iunctus aliis corporibus in igne omnino ardet. Sub ipso planeta est stannum quod est frigidum et siccum, album et porosum, fixum. Commune pondus habet. Est frigidum in primo gradu, siccum in tertio, album in tertio, porosum in primo, fixum in secundo. Sol est calidus, siccus, croceus, fixus, non porosus sed ponderosus, a quo descendit illud metallum

quod vocatur aurum. Et est de sui natura calidum, siccum, colore croceum, fixum, non porosum. Habet magnum (fol. 233r) pondus. Venus est planeta calidus et siccus, porosus et mixti coloris. Pondus habet argenti. Calidus in 3°, siccus in 2°, porosus in 3°. Mars est frigidus et siccus, fixus, porosus, ponderosus. Ab eo descendit metallum quod vocatur ferrum. Et est frigidum et siccum, fixum, non porosum, ponderosum et mixti coloris. Frigidum in primo, siccum in 2°, ponderosum in 3°. Luna est planeta frigidus et humidus, albus, porosus, fixus, ponderosus, de sui natura mobilis quia scito movetur. Ab eo nominatur argentum quod de sui natura est frigidum in 3°, humidum in 2°, porosum in 3°, album in iiii.

Nunc de natura vii magistrorum cum quibus natura omnium metallorum potest servari et destrui et in alteram naturam converti secundum magis et minus. Viso de potestate et virtute in genere nunc de singulis magistris in specie. Scias igitur quod Sal armoniacus de sui natura est calidus in 3° gradu, siccus in 2°, porosus in 4^to^, albus in quarto. Habet minuere pondus et reducere pondus ad commune pondus. Sic igitur ex hoc colligi potest quod sal armoniacus habet dare colorem porositatem, albedinem, pondus commune, et hoc in metallis non habentibus.

Sal gemme est calidum in primo, humidum in 3°, album in quarto, fixum in 3°, non porosum, et habet dare pondus maius. Ex quo colligitur quod sal gemma habet potestatem dandi caliditatem et humiditatem, albedinem (fol. 233v), fixationem et maius pondus non habentibus.

Sal nitrum est calidum et siccum, album, porosum, non fixum. Habet pondus alleviare. Et est calidum in primo, album in medio, porosum in iiii. Colligitur igitur quod potest dare metallis que non habent.

Sal calci est calidum cum temperamento, humidum, album, fixum. Habet pondus alleviare. Non porosum, calidum in medio, humidum in 3°, album in primo, fixum in 2°. Habet potestatem dandi humiditatem et alia que de sui natura habet in suis gradibus.

Sal commune calidum est et siccum sed quia non multum operatur ad transmutationem ideo de ipsius natura pertranseo.

Sal alkali calidum est et siccum, obscurum et non porosum.

Calidum et siccum in primo, obscurum in 2°, ponderosum in iiii. Considerare potes quod omnia predicta dare potest metallo non habenti.

Sal allebrot est magister omnium magistrorum. Et est calidum, humidum, porosum, fixum, ponderosum, album intrinsecus et extrinsecus rubeum. Hoc per se coagulat et tenet mercurium et tingit in lunam et lunam convertit in solem purissimum posita in octava parte in quolibet. Allebroc est terra citrini coloris que si super carbonem ponatur carbo non extinguitur. Et si supponatur cultellus rubescit ex fumo et fit aurei coloris. Invenitur prope Coloniam apud Renum.

(Herewith ends the portion of the text concerned with the qualities and degrees of the seven planets, metals and salts. I append the remaining three paragraphs in the Bern MS, since they are relatively brief and seem to have the best claim to constitute the remainder of the work.)

De transmutacione metallorum Saturni in lunam et solem

Primo qualiter convertitur in lunam. Si perfecte operare volueris, considera naturam utriusque et vide si nature concordant in aliquo. Considera in quo discordant in pondere fixione et porositate vel quasi (fol. 234r) quia saturnus est albus cum obscuritate, Luna est alba cum claritate. Cum vidisti concordanciam procura cum magistris qui hoc facere debent quod reducas concordancias et habebis lunam bonam. Et si queris qui sint magistri qui hoc faciunt, si congregacionem habere non poteris per ea que dicta sunt, considera quis est iste magister qui habet virtutem reducendi grave pondus ad commune. Certe hic est sal nitri. Et restat videre quis est iste magister qui habet virtutem dandi porositatem. Certe hoc est sal armoniacus. Et sic impositis istis magistris cum blumbo ad ignem donec buliat per horam unam et fit bonum argentum. Et ad hoc ut scias negotiari perfectionem. Si nescias in quo gradu natura deficit quam habere desiderat pone octavam partem illius magistri qui habet naturam illam dare.

Fixatio Mercurii in lunam

Recipe unam marcam argenti vivi et purifica optime. Pone in aceto acertivo et lava bene. Cum laveris cola per coreum

et lavabis ter vel quater donec nebula que in ipso apparuerit recesserit semper colando. Ipso sic purificato pone ad ignem donec buliat. Et cum videris bulientem pone in ipso unciam unam argenti boni foliati ita quod melius bibat et fiat mixtatur. Quam iterum ponas ad ignem et intus pone quartam partem uncie salis armoniaci et quartam partem uncie salis nitri. Et mitte ut buliat per unam horam et videbis eum durescere. Postea leva ab igne et habebis lunam bonam.

Fixatio mercurii in solem

Recipe mercurii marcam unam et pone ad ignem et dimitte (fol. 234v) donec buliat. Et cum videbis ipsum bulientem, pone in eo unciam unam auri foliati. Et cum miscueris, leva ab igne et pone in eo octavam partem uncie salis nitri et octavam partem uncie salis alkali et parum armoniaci et parum alboris vel alebroc. Hec omnia pone ad ignem in ampulla bene truncata. Postea claude os ampulle et pone ad ignem. Et dimitte stare per iii dies et noctes. Postea recipe quod invenies, hoc est elixir rubeum cuius uncia una convertit 50 boni argenti in aurum purissimum. Hoc modo funde 50 uncias boni argenti ipso fuso. Pone unciam unam pulveris et stet in igne per unam horam et habebis solem purissimum.

Finiunt foeliciter.

(The remainder of the page is left blank)

TEXT FROM VATICAN PALATINE LATIN 1335, fol. 96 recto.

Incipiunt Secreta Magistri Iacobi secundum Hermetem philosophum inventorem metallorum secundum transmutacionis naturam.

Primo dicendum est quod vii sunt planete secundum cursum quorum omnia inferiora reguntur et sapiunt naturam eorum metallorum secundum magis et minus Saturnus Iupiter Mars Sol Venus Mercurius et luna. Et sicut vii sunt planete ita sunt vii metalla que sapiunt naturam eorum sicut ab eis descendunt. Nomina autem metallorum sunt septem scilicet plumbum quod

a philosophis appellatur saturnus quia ab eo suam trahit naturam. Stagnum quod appellatur Iupiter quia ab eo suam trahit naturam. Ferrum quod appellatur Mars quia ab eo suam trahit naturam. Sol quod appellatur aurum quia ab eo suam trahit naturam. Argentum vivum quod appellatur Mercurius quia ab eo suam trahit naturam. Es quod appellatur Venus quia ab eo suam trahit naturam. Argentum fumum (?) et naturale quod appellatur luna quia ab eo suam trahit naturam. Tu ergo qui vis naturam metallorum mutare vel unius nature in alteram naturam transformare primo considera naturam planetarum per quam scire poteris transformare naturam metallorum. Postea considera naturam metallorum iuxta naturam planetarum per quam plenius cognita scire poteris que tibi necesse erunt ad transformationem suam sive colorationem metallorum et semper quando vis facere aliquid operationem in hac arte fac sub illa planeta que est illius nature secundum cursum lune etc.

Et nota quod vii sunt magistri sicut vii sunt planete et septem sunt metalla qui magistri habent facere transmutaciones metallorum et habent dare co-(fol. 96v)lorem et albedinem et rubedinem et porositatem et fissitatem. Videamus igitur qui sunt isti magistri et sunt isti scilicet primus Sal armoniacus qui fit de sanguine hominis et de sale communi ut plenius distinguemus inferius. Secundus magister Sal gemme qui est coloris cristallini et fit de sale alkali et de sale communi et aqua maris vel salsa naturaliter ut tibi dicemus inferius. Tercius Sal nitrum que fit ex sale gemme et sale alkali. Quartus sal calcis qui fit ex sale nitro sicut inferius distinguemus. Quintus Sal communis qui fit ex aqua maris sive salsa sicut vidistis. Sextus Sal alkali qui fit ex sale gemme et sale nitro bene trito et isto sale multum utuntur vitrarii quia ipsum operatur ad fusionem vitri. Septimus Sal elembrot qui fit de succis quinque erbarum et iste est qui appellatur magister magistrorum omnium quia facit istud mirabile quod facit de mercurio lunam et solem purissimum.

Nunc habemus quot sunt planete et quot sunt metalla et quot sunt magistri : nunc restat videre naturam eorum. Et primo scias quod Saturnus est frigidus et humidus et albus cum obscuritate, tamen est fissum cum quadam mollicie et grave multum et ab isto planeta suam trahit naturam metallum istud quod appellatur plumbum et a philosopho appellatur saturnus. Videamus ergo

naturam ipsius plumbi per capitula ad hoc ut ipsius naturam et colorem scias conservare et in naturam alterius metalli transmutare. Et tu qui (fol. 97r) transmutare desideras naturam metallorum nota quod plumbum est frigidum et humidum et album sed obscurum fixum, non porosum. Diximus tibi naturam plumbi simpliciter quam tibi per gradus describemus. Est igitur frigidum in 3° gradu, humidum in secundo gradu, fixum. Et nota quod quatuor sunt gradus in metallorum naturis secundum Hermetem.

De Iove. Iupiter est frigidus et siccus, fixus, porosus et ponderosus. Ab hoc planeta descendit illud metallum quod dicitur stagnum et est frigidum, siccum, porosum et ponderosum et misci coloris. Et est frigidum in primo gradu, in primo gradu ponderosum.

De Marte. Mars est frigidus et siccus, albus, porosus, fixus et ponderosus, et iunctus cum aliis corporalibus ad ignem omnia ardet. Sub isto planeta est ferrum quod est frigidum et siccum, album, porosum, fixum et habet commune pondus. Et scias quod frigidum est in primo gradu, siccum in 3° gradu, porosum in primo gradu, fixum in 2° gradu.

De sole. Sol est planeta calidus et siccus, fixus, non porosus et ponderosus, a quo planeta descendit metallum illud quod vulgariter aurum appellatur et de sui natura est calidum et humidum, coloris crocei, fissum, non porosum, et habet maius pondus. Et est calidum in tercio gradu, croceum in secundo gradu, fixum in 3° gradu et ponderosum in gradu quarto et cetera de (?). Sequitur de venere (fol. 97v).

De venere. Venus est planeta calidus et siccus, ponderosus et misti coloris, et pondus habet commune. Sub isto planeta est illud metallum quod appellatur eramen et dicitur a philosopho venus quod est de natura sui calidum et siccum, porosum et mixti coloris, et pondus habet argenti. Et (est) calidum in 3° gradu et porosum in 3° gradu.

De mercurio. Mercurius est frigidus et humidus cum siccitate, tamen est albus, liquidus, mobilis et ponderosus, a quo planeta suam habet naturam istud metallum quod appellatur argentum vivum quod est de sui natura frigidum et humidum, album, liquidum, non porosum, ponderosum valde, et habet dare siccitatem omni rei vitam habenti sive vegetabile sive sensibile. Et ut

gradus ipsius nature cognoscas scias quod argentum vivum est frigidum in 3° gradu, album in 2° gradu, ponderosum in 4° gradu.

De luna. Luna est planeta frigidus et humidus, porosus, albus, fixus, ponderosus. Secundum naturam planete nobilis (7) est quia cito movetur. Ad hoc planeta descendit metallum quod appellatur argentum et de sui natura est frigidum et humidum, porosum et album. Pondus habet commune. Et de natura sui est frigidum in 3° gradu, humidum in 2° gradu, porosum in 2° gradu, album in 4° gradu. Pondus habet in secundo gradu et cetera.

Vidimus et descripsimus superius naturas planetarum et (fol. 98r) metallorum. Nunc videamus naturam vii magistrorum cum quibus naturam omnium metallorum potest servari et destrui et in alteram naturam converti secundum magis et minus, quia isti sunt magistri qui habent dare colorem et aufferre et servare secundum plus et minus. Etiam habent dare servare et removere albedinem et omnem alium colorem sicut metallis cognoscitur convenire. Habent etiam potestatem et virtutem dandi conservandi removendi porositatem et pars (?) quam tribunt fixitatem et removent. Habent etiam dare conservare fugare frigiditatem, humiditatem, siccitatem et caliditatem et semper secundum magis et minus.

De virtutibus ipsorum vidimus virtutem et potestatem omnium magistrorum in genere sive universaliter. Nunc autem videamus et distinguamus virtutem et potestatem eorum singulariter per capitula.

Primo scias tu qui cupis noscere magistrorum naturas quod sal armoniacus est unus de vii magistris et est de sui natura calidus in 4° gradu, siccus in 2° gradu, porosus in 3° gradu, albus in 2° gradu, et habet minuere pondus et reducere ad commune pondus. Sic ergo colligere potes tu sapiens quod magister armoniacus habet dare caliditatem, siccitatem, porositatem, albedinem et pondus commune metallis non habentibus.

Sal gemme qui est de vii magistris est calidus in primo gradu, humidus in 3° gradu, albus in 4° (fol. 98v) gradu. Est fixus in iii° gradu, non porosus, et habet dare pondus maius. Et

(7) Probably " mobilis " is meant.

sapiens intelligere potes quod sal gemme habet potestatem dandi caliditatem, albedinem, fixitatem et maius pondus metallis non habentibus secundum Hermetem.

Sal nitrum qui est de vii magistris est calidus et siccus, albus, porosus, non fixus, et habet pondus alleviare. Et est calidus in primo gradu, siccus in primo gradu, albus in medio gradu, porosus in 4 gradu. Colige ergo que habet et pondus habet leviare habentibus metallis.

Sal calcis est unus de vii magistris et calidus cum temperamento caliditatis et humiditatis, albus, fixus, et habet pondus alleviare, non porosus. Calidus est in medio gradu, humidus in 3° gradu, albus in primo gradu, fixus in secundo gradu. Summe ergo quod potestatem habet dandi humiditatem et omnia que habet de sui natura in suis gradibus etc.

Sal commune est calidum et siccum quia non multum operatur ad transmutacionem sive coloracionem et ideo de sui natura plus non describo.

Sal alkali est de vii magistris et est calidus et siccus, obscurus, non porosus, ponderosus. Et notis (8) quod est calidus in primo gradu, siccus in primo gradu, obscurus in 2° gradu, ponderosus in 4° gradu. Considerare ergo debes ex hoc quod omnia predicta dare potest metallo non habente.

(Fol. 99r). Sal elembroth est magister omnium magistrorum et est de sui natura calidus et humidus, porosus et fixus, ponderosus et albus intrinsecus et extrinsecus rubeus. Et ut breviter exponam tibi naturam suam scias quod iste coagulat per se mercurium et tenet et lunam convertit in solem positam etc.

(Herewith ends the portion of the text concerned with the qualities and degrees in the seven planets, metals and salts. The manuscript proceeds :)

Nota quod mercurius primo mortificatur secundo sublimatur tercio funditur et solvitur in 4° coagulatur.

De dissolutione mercurii.

Recipe mercurii decies sublimati...

Columbia University, New York City. LYNN THORNDIKE.

(8) Probably " nota " is meant.

Notes and Correspondence

Answer to Query no. 61.—The dates of birth and death of Johannes Scultetus.

JOH. SCULTETUS (SCHULTES) *senior*, born in Ulm 12 Oct. 1595, died in Stuttgart 1 Dec. 1645. He studied medicine in Vienna but especially in Padua (M. D. 1621) where he remained 15 years under FABRIZIO AB AQUAPENDENTE (1537-1619) and ADRIAAN SPIEGHEL (1578-1625), some years as the latter's prosector in anatomy, at the same time practicing medicine in Padua and Venice. 1625 he is town physician at Ulm. His principal work *Cheiroplotheka seu Armamentarium chirurgicum* was first published, eight years after his death, in Ulm 1653 (fol. with 43 plates), by his brother's son, JOH. SCULTETUS (SCHOLTZ) *junior* born in Nürnberg 7 Aug. 1621 where he also died 13 Feb. 1680. It is this latter who is the author of the *Prophylaxis*, Nürnberg 1665 of which the title page is reproduced *Isis* 25, 452. The elder SCHULTES seems to represent the erudite and publicistic end incited by HARVEY's experimental investigations into the mechanics of living organisms. Whether he was successful in the many daring operations he advocates would be hard to prove. Evidently he collected a rich material from own and hear-say information. The great publicistic success of his *Armamentarium* seems to be due mainly to his sometimes sensational illustrations. There is nothing to show that he drew them himself. " Very desirable indeed " may be a closer study of the man and the work, but mainly to show the *why* and *how* of success of this sort of venture. It would need no great library nor much time for research. A. C. K.

Answer 2 to Query no. 61.—The above reply to Query 61, comes from Dr. ARNOLD C. KLEBS of Nyon. In addition there has come a further elucidation from Dr. MATHILDA SALZMANN, of Stuttgart, with the following information: There were evidently *three* medical men by the name of JOHANNES SCULTETUS in Nüremberg or Ulm in the seventeenth century. The elder SCULTETUS, 1595-1645, was the author of a popular work on surgery which was posthumously published by his nephew, (in 1653), with forty-three illustrations. Later this work, " beträchtlich vermehrt " was published in Holland and then translated

into German and published in Frankfurt, and still later, in France and England. It is not known who was the artist of the copper-plate engravings, for they are not signed, but in the last edition there were fifty-six in all.

Of the second JOHANNES SCULTETUS we find only that he was city physician in Ulm, a seventeenth century "forgotten man."

The third, 1621-1680, seems to have been more literary than the others and more of a hygienist than they. He was born in Nüremberg, a nephew of the first Scultetus, and he became a member of the *Leopoldinische Akademie* to which he contributed certain articles. He was the translator of MINDERER's *Military Medicine*, 1667, and of GIOVANNI DI VIGO's *Surgery*, as well as that of his uncle in 1653, and to each he made certain additions of his own. In 1658 he wrote "*Norimbergensis Trichiasis admiranda s. morbus pilaris observatus.*" In 1665 came his "*Prophylaxis circa presentem et futurum sanitatis statum*, and, in 1666, his "*Plantarum cultura.*"

(These notes are taken from the *Biograph. Lexikon der hervorragenden Ärzte aller Zeiten und Völker*, HABERLING und VIERORDT, 1934.)

As Dr. KLEBS says, it would be worth while to make a closer study of all of these three men who are named SCULTETUS, SCHULTES, SCHULTHEISS, SCHULZE or SCHOLTZ, and particularly of the junior member of the family who was a botanist, an editor, and an early believer in preventive medicine. He lived at a time when MINDERER believed in the efficacy of oil of worms for the cure of plague, and DI VIGO was advocating the use of boiling oil for healing wounds, and when the practice of Royal Touch had not quite reached its height.

(*Haddam, Conn.*) KATE C. H. MEAD.

Answer 3 to Query no. 61.—In seventeenth century Germany there were three medical men by the name of JOHANNES SCULTETUS. There was JOHANNES SCULTETUS of Ulm who lived from 1595 to 1645. There was his nephew of the same name and place, who died in 1663, and there was a third of the same name who lived in Nürnberg from 1621 to 1680.

I. JOHANNES SCULTETUS of Ulm (1595-1645).

This SCULTETUS is the one who was born in Ulm in 1595, was educated in Italy and returned to Ulm to practise medicine, but died in 1645 in Stuttgart whither he had gone to attend a patient. It was he who wrote the book entitled *Armamentarium chirurgicum*, which was first published posthumously by his nephew in 1653, and later went through many editions and translations.

Accounts of this SCULTETUS can be found in:

Allgemeine Deutsche Biographie, XXXIII, 499.

Biographie Universelle Ancienne et Moderne (MICHAUD), 2nd edition, vol. 38, pp. 600-601.

Biographisches Lexikon der hervorragenden Ärzte aller Zeiten und Völker, 2nd edition, vol. V (1934), 156.

FREHER, PAUL : *Theatrum Virorum Eruditione Clarorum...* Nürnberg, 1688, III, 1374.

JÖCHER, CHRISTIAN GOTTLIEB : *Allgemeines Gelehrten-Lexicon* (1750-1), IV, 453.

WITTE, HENNING : *Diarium Biographicum...* Gedani, 1688, recto of signature Uu (under Obiit anno 1645).

Further references can be found in the following works which have been cited in the references given above :

BISCHOFF, LUDWIG : *Leichenpredigt* J. SCULTETI, *philosophiae, medicinae et chirurgiae doctoris.* Ulm, 1646. (FREHER).

Dictionnaire historique de la médecine ancienne et moderne, edited by OLLIVIER DEZEIMERIS and RAIGE-DELORME, IV, 138. (Biographisches Lexikon...)

ELOY : *Dictionnaire de médecine.* (Biographie Universelle...) This is either ELOY's work printed in Liége and Frankfort in 1755 in two volumes, or his work of a similar title, printed in Mons in 1778 in four volumes.

HALLER, ALBERT VON : *Bibliotheca Chirurgica*, I, 1774, p. 355. (Allgemeine Deutsche Biographie and Biographie Universelle).

JOURDAN, A. J. L. : *Dictionnaire des sciences médicales, Biographie Médicale*, VII, 185. (Biographisches Lexikon.)

KESTNER : *Medicinisches Gelehrten-Lexicon.* (JÖCHER.)

VAN DER LINDEN : *De scriptoribus medicis.* (JÖCHER.)

PORTAL : *Histoire de l'anatomie*, t. 3, p. 44. (Biographie Universelle.)

WEYERMANN, ALBR. : *Nachrichten von Gelehrten, Künstlern u. s. w. aus Ulm.* Ulm, 1798, p. 475. (Allgemeine Deutsche Biographie and Biographisches Lexikon.)

II. JOHANNES SCULTETUS of Ulm (died 1663).

This SCULTETUS was the son of the brother of the SCULTETUS discussed above and is often spoken of as SCULTETUS junior. He too lived in Ulm, where he was city physician and where he died in 1663 of spotted fever. It was he who edited his uncle's *Armamentarium chirurgicum.* He is mentioned in several accounts about his uncle as editor of his uncle's book, but that is all that is said concerning him in the references given above for his uncle. I do not see how he can be confused with the JOHANNES SCULTETUS of Nürnberg. The *Biographisches Lexikon* mentions him only in volume V, 156, in the article about the uncle.

The fact that a JOHANNES SCULTETUS of Ulm was city physican in Ulm in the seventeenth century is not contained in that reference book.

An account of this SCULTETUS is given in JÖCHER (*op. cit.*, IV, 453), where reference is also made to KESTNER (*op. cit.*).

III. JOHANNES SCULTETUS of Nürnberg (1621-1680).

This SCULTETUS is of much greater historical importance than the younger SCULTETUS of Ulm, with whom he has been confused. He was born in Nürnberg in 1621 and died in 1680. WITTE (*op. cit. under Obiit anno* 1687) has given the date of his death as 1687, but this is no doubt erroneous as WILL has pointed out. JÖCHER (*op. cit.*, 453-4) also gives the date of 1687 but he has undoubtedly taken it from WITTE, whose work he cites. It was this SCULTETUS who wrote the work on the prophylaxis of disease mentioned by Mrs. MEAD in Query 61. Besides several speeches mentioned by WILL, his writings include :

Trichiasis admiranda, sive morbus pilaris obseruatus. Nürnberg, 1658.

Prophylaxis circa praesentem et futurum sanitatis statum oratione proposita. Nürnberg, 1665. (This public speech has an introduction by J. M. DILHERR.)

Nürnbergisches Bethesda, oder Wildbad. (This speech was given in German in 1665 and printed in Nürnberg in 1666 with an introduction by DILHERR.)

Plantarum cultura oratione exculta. Nürnberg, 1666.

RAYM. MINDERER's *Kriegsarzney*, added to and edited by SCULTETUS. Nürnberg, 1667.

JOH. DE VIGO's *Wundarzney*, translated into German by SCULTETUS.

Obseru. de Andria. Extat *Ephem. Acad. Nat. Cur. Germ.* Ann. II. N. 253.

Obseru. de duobus monstris. Ibid. Ann. III. N. 224.

Obseru. de hydrope ascite cum hydromphalo. Ibid. Ann. IV. et V. N. 148.

Accounts of this SCULTETUS can be found in :

Biographisches Lexikon, op. cit., V, 127.

JÖCHER, *op. cit.*, IV, 453-4.

WILL, GEORG ANDREAS : *Nürnbergisches Gelehrten-Lexicon*, III, 664-5.

WITTE, *op. cit.*, verso of signature Aaaaa2 and recto of Aaaaa3 (under Obiit anno 1687).

Further references are given in the above works and are :

DÉCHAMBRE, A. : *Dictionnaire encyclopédique des sciences médicales.* 3. Série, VIII, 371.

JOURDAN, *op. cit.*, VII, 185.

KESTNER, *op. cit.*

MERCKLINUS, G. L. : *Lindenium renouatum.*

MOLLER : *Homonymoscopiam*, p. 721.

(New York City) C. DORIS HELLMAN

History of science society. — *Thirteenth Annual Meeting, Brown University, Providence, Rhode Island, Wednesday, December* 30, 1936.

A.M. 10 : 00 : *Joint session of the American Historical Association and the History of Science Society*, (Faunce House Lounge, Brown University).

Chairman, CHAUNCEY D. LEAKE, University of California.

President's Address : The Evil Science Does. CHAUNCEY D. LEAKE, University of California.

JOHN HOWARD and the Public Health Movement : LEONA BAUMGARTNER, New York Hospital.

New Light on Reverend THOMAS THACHER'S *A Brief Rule* (1677-78), the First Medical Document to be Published in this Country : HENRY R. VIETS, Boston, Massachusetts.

The History and Work of the Army Medical Library (illustrated) : Major EDGAR ERSKINE HUME, Carlisle Barracks, Pennsylvania.

Scientific Glossaries in Sixteenth Century English Books : SANFORD V. LARKEY, Johns Hopkins University.

BARTOLOMEO MONTAGNANA'S *Consilia* (1476) : ARNOLD C. KLEBS, Nyon, Switzerland.

P.M. 12:15 : *Complimentary luncheon tendered by Brown University to members of the American Historical Association and Societies meeting concurrently*, Sayles Hall and Faunce House Dining Room, Brown University.

P.M. 2:00 : *Council meeting and informal round table discussion of the problems relating to the history of science*, Faunce House Lounge, Brown University.

Program committee, History of Science Society: CHAUNCEY D. LEAKE, *Chairman*, SANFORD V. LARKEY, JOHN F. FULTON, RICHARD H. SHRYOCK, FREDERICK E. BRASCH, *Secretary*.

Prix Binoux 1936. — Le Prix Binoux d'histoire et de philosophie des sciences a été attribuée cette année par l'Académie des sciences, à PAUL NÈVE DE MÉVERGNIES, professeur à l'université de Liége (*Isis*, 25, 540), et à l'ingénieur CHARLES CABANES (*Isis*, 26, 255).

Reviews

G. Senn. — *Die Entwicklung der biologischen Forschungsmethode in der Antike und ihre grundsätzliche Förderung durch* THEOPHRAST VON ERESOS. 262 p., portrait. Aarau und Leipzig, H. R. SAUERLÄNDER & Cie., 1933. Price 10 R. M.

This is the 8th volume of the series of publications of the Swiss Society for the History of Medicine and the Natural Sciences. The author surveys the literature from classic times to GALEN in the endeavor to determine what methods, if any, were then originated which had advanced or hindered the later development of biology.

The first and basic great advance was the methods of observation used by ALCMAEON, the great HIPPOCRATES, ARISTOTLE, and THEOPHRASTUS. The second great step was taken when systematic experimentation was introduced, not only to gain a deeper insight into natural phenomena but also to test the correctness of scientific hypotheses. The oft repeated expressions by the older philosophers of doubts of the trustworthiness of observation and the mistrust of many biologists of experiments because they interfered with natural conditions and processes only gave way when observations and experiments gave consistently the same results. This was the beginning of the use of statistical methods. Another essential prerequisite was that observations should be made under critical control so as to avoid the introduction of error.

Even before the importance of observation was recognized and utilized, the philosophers, SOCRATES, PLATO, and ARISTOTLE, had insisted upon the value of logic and of critical concepts in the investigation of nature. This philosophical influence repeatedly continued to exercise a powerful control in shaping biological thought in matters where principles, hypotheses, and analogies were utilized without the corrective aid of critical observation. The question whether observation or logical analysis plays the major rôle in biology was well known and the idea that the two should go hand-in-hand was not unknown.

The earliest of the Greeks to approach these ideals of the scientific methods of lasting value was HIPPOCRATES, the great physician of Cos, who in spite of the fact that he was a follower of the theory of humors based on deduction, nevertheless utilized observation to an extraordi-

nary degree and must be ranked with the biologists using the inductive method.

An equal meed, however, can not be awarded to ARISTOTLE, according to the author, without the reservation that, however brilliant his observations, he still tended to give the final word to his deductive philosophical speculations in his interpretations of phenomena of nature. ARISTOTLE's outstanding contributions to logic and to concrete zoological investigations easily place him in the front rank as a forerunner and a preparer-of-the-way for biology, but not to the same extent, for the scientific method.

It is to THEOPHRASTUS of Eresos that we must look for a renunciation of deduction and analogy in the erection of a system of interpretation of nature, and for the founding of a sound inductive basis of observations upon organisms and upon factors operating in their environment. With their aid he was in a position to arrive at a realistic explanation of natural phenomena. On this rests the wonderful stability and accuracy of his scientific conclusions. He confined his conclusions to the results of his observations, did not enter upon unwarranted generalizations, and did not neglect the observations on logical grounds, as did the later empirical school of physicians. The author disagrees with SIMPLIKIOS, GOMPERZ (1909), and JAEGER (1929), who aver that THEOPHRASTUS followed his master's methods. THEOPHRASTUS' work is in reality the turning point from an idealistic to a realistic concept of nature. His follower STRATON, the physicist, utilized experiment and employed hypothesis. HEROPHILOS, of the Alexandrian School, introduced the quantitative method, for example, in recording the pulse with the aid of the water glass. He, however, used deductive elements in his therapy. ERASISTRATUS, his colleague, also used quantitative (weighing) and experimental methods in his physiological work but applied deductive reasoning to his results.

These three, THEOPHRASTUS, STRATON, and HEROPHILOS (310-250 B.C.) represent the brilliant period of the development of the scientific method in Greek science. After their day deduction and analogy returned in full force, system building and logical schemes ruled biological thinking, and utilitarianism and mysticism crushed science till its awakening by ROGER BACON in the 13th Century.

The author rates GALEN as an impediment to science because of his teleology, and in so doing seems not to credit him adequately for his application of the experimental method in problems of physiology.

CHARLES A. KOFOID

E. E. Sikes. — LUCRETIUS *Poet & Philosopher*. ix + 187 pp. Cambridge : At the University Press; New York : The MACMILLAN Co., 1936 ($2.25).

LUCRETIUS is a one-poem man, the writer of the supreme philosophical poem of all the ages, *De Rerum Natura*, and all the ages have had something to say about him and his poem, but never more than in our own time and never quite enough. Even to-day there does not exist a complete study of LUCRETIUS as Poet, Philosopher, and Scientist, perhaps because no single student of LUCRETIUS has possessed all the necessary qualifications, yet if all that has in recent years been written upon LUCRETIUS and his forerunners were adequately digested by one person — and it could be most pleasurably done — we might have a study which need never be superseded. Will not some young humanist be persuaded to undertake the voyage? Professor H. W. GARROD has recently said (*The Study of Poetry*, Oxford, 1936) that man by his addiction to the tree of knowledge has sustained a poetic Fall. Science has had the effect of pushing feeling out of the way of life, and the weight of material knowledge has almost crushed the life out of most scientists, leaving them hardly lukewarm, and passionless, pursuing the dulling tenor of their way without benefit of poetry, or spirit, or humanity. The machine hangs over the man and science hangs over his spirit. The Platonic dichotomy of Reason and Feeling has brought about a schism in the individual, and if the schism is complete we have either a raving maniac, a neurotic, a fragmented personality, or a scientist, — at least, such a scientist as the generality of scientists are. This much of the Platonic element there is in LUCRETIUS, and there is some evidence that he did not escape the effects of the dissociation. There is a tradition that he was highly strung, that he eventually became insane, and, of course, that he wrote his great poem during the more or less lucid intervals, and that he died by his own hand. Professor SIKES, in the present study which treats of the more human aspects of LUCRETIUS as poet, thinks the suggestion of suicide credible though unlikely. The vehement energy of LUCRETIUS' poem, the fact that it was unfinished at his death, that he had begged his Muse to point out the goal, and that he had thought of glory, all argues, thinks Professor SIKES, against his extinction by his own volition. Who can say? Men are curious beings, and we know of enough instances of brilliant men who have snuffed out their own existance in the middle of their life's labours, to render the notion that LUCRETIUS did the same quite feasible in spite of his vehement energy, or perhaps because of it. For the Epicurean death, as Professor SIKES reiterates in an excellent chapter, held no fears, in the poet's own words...

To us, then, death is nothing, and no whit
Concerns us, since the nature of the mind
Is proven mortal. iii. 830ff. (SIKES).

...but the Stoic refuge of suicide was a depressive thought to the Epicurean who could see no virtue in the idea that it is nobler to co-operate with the Gods than to be dragged by the Fates.

TITUS LUCRETIUS CARUS — to give him his full name which, curiously, Professor SIKES does not mention in his fine chapter on the life of LUCRETIUS — was almost certainly born between 100 and 94 B.C., and died about 55 or 54 B.C., and as we have noted, his great poem at his death was unfinished and unpublished, — and this is practically all that we know of his life, all else is conjecture or unreliable gossip. The epic style of the poem admits no shadow of light in connection with the poet himself, and of contemporary references to the poet's personality there are none. Whether he commenced as an Empedoclean in philosophy and then graduated to the philosophy of EPICURUS we do not know, though this is probable, for EMPEDOCLES whom he warmly admired served him as a model for the poem which is *the* great exposition of the philosophy of EPICURUS and, as Professor SIKES says, that LUCRETIUS did more than follow EPICURUS cannot be proved.

The noble eloquence of LUCRETIUS' epic is ably discussed by Professor SIKES, who discourses upon its beauties, many of which he renders into English verse, charmingly, and at the same time a clear generalized analysis of the poem and its philosophical background is provided. LUCRETIUS, as Professor SIKES has said in another work (*The Greek View of Poetry*, London, 1931), is a great poet by his power of bringing the Nature of Things into close relation with the hopes and fears of humanity. "We read *De Rerum Natura* not merely, or perhaps not mainly, because it grasps the 'majesty of things,' but because it exhibits the Universe as the framework and setting of human life," and, it may be added, does so humanly, indeed, it is this very *humanitas* of the poet which sets him off from his master EPICURUS who, as Professor SIKES points out,seems to have been strangely impervious to the beauty and grandeur of the Universe, at least so his writings would suggest. In a recent delightful little book (*Science in Antiquity*, London, 1936), Professor B. FARRINGTON in one place refers to the *stern eloquence* of the *De Rerum Natura*. Is "stern" here quite the right word? Something in us rebels at the word in connection with LUCRETIUS, and it is the great merit of Professor SIKES' book that he is able to point for us the essential warmth and humanity of the poet and his poem. And as for that scientific materialist EPICURUS we think that WALTER SAVAGE LANDOR

was not less just than generous when he made him speak in the accents of a great humanist.

There is a good index, but no list of references, the latter being given in footnotes, unfortunately without either place of publication or date of issue.

New York University M. F. ASHLEY-MONTAGU

Casey A. Wood.—*Memorandum Book of a Tenth-Century Oculist.* For the Use of Modern Ophthalmologists. A Translation of the *Tadhkirat* of ALI IBN ISA of Baghdad (cir. 940-1010 A.D.), the most complete, practical and original of all the early textbooks on the eye and its diseases. Northwestern University, Chicago, XXXIX + 232 pages with 18 illustrations, 4to, 1936.

Dr. CASEY ALBERT WOOD is one of the fathers of twentieth century Ophthalmology in America. Born in 1856 he was for many years professor of Ophthalmology at the Northwestern University in Chicago. He taught many hundreds of pupils, most of whom became themselves distinguished oculists; he was himself a wonderful practitioner and ophthalmic surgeon. Besides this, his literary activity has always been amazing. He was a co-editor of the *Annals of Ophthalmology and Otology* (founded in 1893) and of *Ophthalmology* (founded in 1902); he contributed valuable articles to many other ophthalmological journals of America and Europe, and he published several giant encyclopedias which would have been alone the life-work of a less diligent worker. They are *A System of Ophthalmic Therapeutics* (a volume of 926 p., Chicago 1909), *A System of Ophthalmic Operations* (two vols., 1829 p., Chicago 1911), and *The American Encyclopedia and Dictionary of Ophthalmology* (with a staff of collaborators; 20 vols., Chicago 1913-21). In these works CASEY WOOD dealt largely with the history of ophthalmic therapy and surgery. We owe him moreover a notable work on alcoholic amblyopia (1904). After his retirement from his professorship he devoted his activity at first to his secondary predilection, to Zoology, especially to Ornithology. A first work was a wonderful book on the fundus oculi of birds (1917), and after many years of patient researches, travels and collections, there followed his standard work: *Introduction to the Literature of Vertebrate Zoology* with a most complete bibliography (McGill University Publications, Montreal, publ. Oxford Press, London 1931; *Isis* 18, 207). At the same time he had resumed ophthalmological publications from a historical point of view. He published an English translation of BENVENUTUS GRASSUS of Jerusalem, *De Oculis* (Stanford University Press, 1929; *Isis* 14, 232) with notes and illustrations from the first printed edition (Ferrara 1474). A valuable catalogue of the

codices and prints of this treatise concludes CASEY WOOD's fine edition.

At the age of 75, Professor CASEY WOOD began to study the Arabic language in order to translate Arabic ophthalmological works into English. But he was, by his own avowal, unable to overcome its manifold difficulties. As he was eager, however, to furnish a large body of readers with an English translation of 'ALĪ IBN 'ISĀ's *Tadhkirat al-Kaḥḥālīn* (" The Oculists' Memorandum Book ") the best textbook of ophthalmology ever written before the XVIIIth cent., he translated into English the German version of the book. This had been published by HIRSCHBERG (oculist) and LIPPERT (orientalist) under the title of *Ali ibn Isa Erinnerungsbuch fuer Augenaerzte* (Berlin 1904). For more bibliographical information, see SARTON's *Introduction* (vol. I, 731). It was a very important edition which ought to have been followed by the edition of the Arabic text; the reviewer hopes that the text will, some day or other, be edited in Cairo, where MSS. of the book are frequent and where Arabic printing is not expensive. 'ALĪ IBN 'ISĀ was a Christian oculist living in Baghdad where he died about 400 A. Hijrae (1010 A.D.). His book was in great favour with Oriental oculists, has been many times extracted, summarized and translated into Persian and Turkish. In the West, it was translated into Hebrew and Latin. The latter version was well known under the title of *Memoriale Ocularium* (newly edited by PANSIER in Paris, 1903).

Now, the present beautiful in-quarto volume was published by Prof. CASEY WOOD in this year of grace 1936 in which he reached his eightieth birthday, as a manifestation of his indomitable will and his unchanged energy. May I say that CASEY WOOD is now living his *otium cum dignitate* in Rome among the treasures of the past and near to the Oriental Section of the famous Vatican Library where he has a ready helper in Prof. LEVI DELLA VIDA. And he dedicated the book to the memory of another great American ophthalmologist, that of HAROLD GIFFORD, his " life-long friend and companion in many adventures on and about the seven seas." C. WOOD's English translation truly follows the German version and renders very well the meaning of the Arabic text, although it cannot be literal, as a double translation necessarily gives way to certain divergences. He added an introduction giving a summary of the main Arabic treatises on eye diseases written during the five centuries from ca. 800 to 1300 A.D. and a note about the few life dates of 'ALĪ IBN 'ISĀ and on his names known in the Latin West (*Jhesu filius Haly*, *Jesus Ali*, etc.). The rendering of the text is in very fluent English, more agreeable to the reader than HIRSCHBERG's antiquely German style. The notes are mostly taken from HIRSCHBERG's book, and so are several of the plates and text-illustrations.

'ALĪ IBN 'ISĀ's treatise is divided into three " discourses " or books. The first treats of anatomy and physiology of the eye, based on the Greek conception of the subject which was arrived at by autopsy of animals and, therefore, not quite corresponding to modern anatomical conceptions. Visual acuity and errors of refraction were, e.g., explained by a hypothetical " visual spirit " flowing from the brain through the supposedly hollow optic nerves into the eyes, and by its alterations. The second and most voluminous book of the treatise is devoted to the external diseases of the eye. It comprises not less than 74 chapters many of which are rather long. It is this book which was one of the glories of Arabic medicine, as it deals in a very systematic manner with diagnosis, etiology, semeiology and therapeutics of each disease. The operations are described in such a clear and concise manner that every surgeon can perform them in our days even, according to the author's description. Several diseases and their causes were erroneously judged, as for instance cataract, considered by Greeks and Arabs as a membrane formed between lens and iris. But we must not forget that the definite discovery of the real nature of cataract as an opacification of the lens was not made earlier than in 1709 (by the oculist BRISSEAU in France). The medical treatment of eye-diseases was accomplished, at this period, mostly by the use of natural plants and drugs. Recipes of all kinds abound throughout the *Tadhkira*. Therefore CASEY WOOD inserted into 'ALĪ IBN 'ISĀ's chapter " On the Faculties of Remedies " a long and helpful paragraph of alphabetically arranged drugs which were in use by the Arabs. This chapter furnishes much useful information and is adorned, moreover, by nine beautiful plates with reproduction of plants from old MSS. of DIOSCORIDES' *Materia Medica*. This chapter is followed by another one on Medieval ophthalmic instruments with illustrations from a MS. of the Syrian oculist KHALĪFA IBN ABI'L-MAḤĀSIN (XIIIth cent. A.D.).

I give, hereafter, as an example of 'ALĪ IBN 'ISĀ's concise manner of describing his therapy, CASEY WOOD's translation of the fortieth chapter " On Foreign Bodies in the Eye and their Treatment " : " When soot, dust and similar bodies get into the eye they are, as a rule, easily removed by repeated instillations of woman's milk. Fresh water acts in the same way. When a fine straw or a grain of sand enters the eye and is not readily seen, evert the upper lid and you will probably detect the foreign body imbedded in the tissues. Remove it with the end of a spud, or wrap a piece of linen around the tip of your finger and wipe out the intruder. If a rough foreign body lodges on the internal surface of the lid or on the eyeball (a beard or spike of grain, for example) remove it with the foreign-body forceps, afterwards instilling woman's milk."

The third book of the treatise is less interesting to us, as it treats of the internal diseases of the eye which were nearly unknown until the era of ophthalmoscopy (1850 A.D.). There are nevertheless some good chapters on nightblindness, migraine and on hygiene of the eye. A bibliography of European books dealing with Arabic Ophthalmology concludes this meritorious edition which is perfect in print and paper. The inevitable misspelling of many Arabic technical terms is not a great defect in this book which is not intended for orientalists, but for oculists only.

We have to thank the famous and venerable author for having made the English speaking world acquainted with one of the best scientific works of the Arabic Middle Ages. We hope that he will continue his indefatigable activity for long years to come, for the benefit of the history of science.

Cairo. MAX MEYERHOF.

Leonhard Stejneger. — *Georg Wilhelm Steller.* xxiv + 623 pp. Harvard University Press, 1936, ($ 6.00).

GEORG WILHELM STELLER (1704-1746) is remembered to-day, if he is remembered at all, as the author of a short though masterly publication on marine animals *De bestiis marinis*, 1751, in which a comprehensive description was for the first time given of four altogether unknown marine mammals, the fur-seal, the sea-lion, the sea-otter and the great northern sea-cow; for the rest, his name has been attached to a goodly proportion of various species of animals and plants, and the fact that he was the first man to see, to set foot and to make naturalistic observations on Alaskan soil, has earned him the title of the Pioneer of Alaskan Natural History. How truly he deserves this title is now for the first time really made fully known by the enthusiastic and exhaustive labours of Dr. STEJNEGER who, for more than fifty years, has tracked down every possible item of interest relating to his subject, and who, moreover, as himself, from the day he set foot on Bering Island in May 1882, literally trailed STELLER's footsteps practically, as he says, from the cradle to the grave. The result is a beautiful monument to the memory and to the life and work of a great naturalist who, indomitable of spirit and of energies inexhaustible in the cause of science, met with a tragic death on the very eve of reaping the benefits of his numerous and variegated labours. Dr. STEJNEGER in writing the *Iliad* of his remarkable subject has given us his *Odyssey* too, a book which is of heroic proportions in every way. The author modestly says that "It is only the plain tale of the life of a great naturalist who during a brief but eventful career achieved immortality by the display of qualities which characterize

the true scientist," but if there is any plainness about the tale it is in the absence of any attempted literary elegancies, and if Dr. STEJNEGER has a disarming affection for split infinitives and sentences ending with prepositions, the tale he has to tell gains rather than loses by the naturalness with which it is told.

As we follow STELLER, literally from his ancestors to the descendants of his friends, the background against which he moved and the factors which moved him under Dr. STEJNEGER's skillful hand all become matters as vitally interesting as they were in the day in which they played their parts in the great adventure in which STELLER though one of many was alone.

STELLER spent seven years with the great Second Kamtchatka Expedition which was brought into being by PETER THE GREAT and organized by the Academy of Sciences at St. Petersburg. Never before or since has there been an expedition on so lavish and prodigious a scale. Europe was to be awed by Russian grandeur and Russian achievement. BERING was to undertake the leadership of the expedition and was himself to determine definitely whether Asia was not joined to America as he had already shown, although not to the satisfaction of his ennemies. STELLER joined BERING on this voyage of exploration as mineralogist officially but actually as a surgeon, and it was he who was first to catch a glimpse of Alaskan territory. The disaster which overtook the expedition, scurvy and later shipwreck, might have been avoided if STELLER's advice had been taken concerning the kind of drinking water shipped, and had he been allowed time to collect anti-scorbutic plants. But STELLER had a way of antagonizing people, the scholar among boors, he was, shall we say, a little difficult, and if it could be helped people would rather not take his advice, although the amazing efficiency with which he carried out things as soon as he and what was left of the ship's crew found themselves on Bering Island, soon forced them to alter their attitude towards this "curious fellow." The story of their eight months imprisonment, during which BERING died, on this island is extremely well told, and it is to STELLER to whom a large proportion of the credit falls for keeping the survivors alive and even merry during this time, and it is perhaps characteristic of the man that when later exaggerated reports of the part he had played appeared in the press that he should write to his brother "I should like very much to know who has been making me out a sailor and a windbag. My desire is to fill gaps in the realm of science, not vacant space in newspapers." It was during the imprisonment on Bering Island that STELLER made the observations which were posthumously published as *De bestiis marinis*. The courage and the industry of the man were irrepressible.

The thousands of specimens he collected wherever he went, his voluminous notes, all gotten together with such pain and suffering, these, as Dr. STEJNEGER writes, "have chiefly served to glorify the names of other naturalists who many years later fell heir to his treasures of collection and observation." STELLER made observations on everything, he made a careful study of the languages and customs of the native peoples with whom he came into contact, and exhibited a sympathy and understanding of them which, for the early eighteenth century, is unique in the history of ethnological thought. He constituted himself defender of the oppressed Kamtchadals, and there is evidence that his memorials to the authorities at St. Petersburg in their behalf were not without their effect. It is a great and noble story that STELLER lived and Dr. STEJNEGER has told it greatly, a story in the great style of heroic tragedy.

There is an exhaustive bibliography and an excellent index, and there are twenty-nine illustrations. As a contribution to the history of science the book is of the first order.

New York University M. F. ASHLEY-MONTAGU

Louis Roule. — *Lamarck et l'interprétation de la nature.* 247 p. Paris, E. FLAMMARION, n.d. Price 12 fr.

This is the fourth volume in a series of six in *L'histoire de la nature vivante d'après l'œuvre des grands naturalistes français* by Professor ROULE of the Museum of Natural History of Paris.

A material existence, laborious and modest; an intellectual life, spirited and ardent; a long old age of infirmity and neglect; a death, unnoticed and at once forgotten; and then a glorious resurgence achieving an apotheosis; such was the life of Lamarck. In this significant summary Professor ROULE characterizes the greatest of the French transformists. The author relates the life of LAMARCK before (1744-1793) and during (1793-1829) his professorship at the Museum of Natural History at Paris; reviews his work as botanist, zoologist, biologist, and philosopher; and then proceeds to analyse and place in a historical perspective his evolutionary ideas.

LAMARCK who introduced (?), or certainly made available the word *biology*, had a philosophy, which, though he himself designated it as zoological, was nevertheless more truly biological. It was to the organization of all life that he addressed his analysis and dynamic interpretation. His professional writings, it is true, dealt with form and classification, but in his thinking, as revealed in his philosophic ideas, life was vibrant with energy. Thus to him, animal form became plastic and changeable, responding to the impact of the changing environing factors. But not all initiation of activity was of external origin.

The organism itself had needs, desires, and an inward impulse to master its environment.

LAMARCK came at a time when the writings of BUFFON had divided the thought of the age into the militant camps of creationists and evolutionists. His emphasis upon the environment was in accord with the dominant social philosophy of the period of the Revolution. His public snub at the hands of NAPOLEON happened in the period of reaction following the Revolution.

The author recognizes that LAMARCK's hypotheses in his *Philosophie zoologique* and his *Système analytique* were primarily oriented by his line of thought rather than by extensive observations upon organisms. In this respect he was in sharp contrast with CUVIER whose intimate knowledge of structure and wide knowledge of classification were vastly superior to those of LAMARCK. One sees how little LAMARCK really knew of the true relationships of the invertebrates when one compares his system with that of the *Règne animal*.

The writings of BUFFON and especially of LAMARCK supported the idea of an *ascension vitale* or scale of being, set forth concretely in tables of affinities, not always well founded, but embodying the idea of descent and change, never quite as succinctly stated as in DARWIN's trenchant phrase "descent with modification." The harmonious spectacles of an active Nature were described by the genius of a BUFFON, assisted by DAUBENTON. The genius of a CUVIER arranged and numbered them, but the genius of LAMARCK penetrated more deeply into the modes of their changing patterns.

CHARLES A. KOFOID

Collected Scientific Papers of Sir William Bate Hardy (1864-1934). — Fellow of the Royal Society, Fellow of Gonville and Caius College, Cambridge. Published under the auspices of the Colloid Committee of the Faraday Society. xii + 922 p., portrait, 14 pls., numerous figs. in text. Cambridge, At the University Press, 1936. Price $ 18.00.

The cooperation of the Dominion Governments of Australia, South Africa, and New Zealand; of the Masters and Fellows of Gonville and Caius College; of the Royal Society; of the Chemical, Biochemical, Physiological, and Faraday Societies; and of the Cambridge University Press has made possible the publication of this sumptuous volume, in every respect worthy of the illustrious author of the *Papers* here assembled. This very cooperation is an allegory of the wide range of scientific interests and achievements in various scientific disciplines of this great biologist. Sir HUGH ANDERSON, late Master of HARDY's College epi-

tomized the guiding principle running through the varied and changing fields of HARDY's investigations in the remark, "HARDY once observed a cell divide under a microscope, and wondered why." This wonder of his links together the 59 papers here reprinted and emerges into a comprehending and forceful expression in two most notable papers; The *Physical Basis of Life* (1906) and *To Remind : a Biological Essay.* The Abraham Flexner Lecture (1934).

This work is especially significant as a historical document in the history of science showing changing direction and emphasis from 1891 to 1934 in the work of a leader during a time of growing synthesis of the physical and biological sciences, perhaps the opening period of a higher evolution of synthesis in the methods of science and a wider vision alike of its possibilities and baffling difficulties.

The earlier papers are histological, morphological, cytological, and physiological; in rapid succession, shifting from wandering cells to the oxidising powers of different regions of the spectrum in relation to the bactericidal action of light and air, action of oxyphil upon bacilli, coagulation of proteid by electricity, reversibility of colloidal systems, globulins, structure of protoplasm, surface electric charges of living cells, and the general theory of colloidal solutions. In 1912 his interests shifted to problems of composite fluid surfaces, mechanical stability of films, interfacial tension, electrical potential within the living cell, the spreading of fluids, static friction, lubrication, chemistry at interfaces, adhesion, molecular orientation in living matter, and the boundary state.

All educators interested in the aims, methods, and curricula in universities, designed to train investigators and leaders in scientific method and in the comprehension of basic principles of science, will find in this presentation of the work of one farsighted pioneer in the synthesis of the disjunct scientific disciplines of our present day a challenge to the inadequacy of our present disintegrated and incoherent educational system.

CHARLES A. KOFOID

Masumi Chikashige.—*Alchemy and Other Chemical Achievements of the Ancient Orient.* The Civilization of Japan and China in Early Times as Seen from the Chemical Point of View. Tokyo, ROKAKUHO UCHIDA, 1936. 102 pages, 17 plates. Price 1.50 Yen.

This is an English translation of a book which appeared in the Japanese language in 1929 under a title which may properly be translated " Metallurgic Arts in the Orient." The Japanese version contained a discussion of European alchemy which is omitted from the

present translation. The work is divided into three parts which deal respectively with Chinese alchemy, with Chinese bronze, and with Japanese steel swords.

Concerning the *Ts'an T'ung Ch'i* (c.f. *Isis*, 18, 210-289 (1932)) CHIKASHIGE says, " This book is without doubt one of the Taoist classics but it is too abstract and esoteric for our study." He considers that many alchemical books can be enumerated but that, " in the final analysis, only two works, *Pao-p'u-tzŭ* " (written by KO HUNG, fourth century, A.D.) " and *Pên Ts'ao Ching* " (a treatise on materia medica published toward the end of the *Han* dynasty) " remain as the authentic sources of information on the earlier Chinese alchemy." Biographical accounts of KO HUNG and T'AO HUNG-CHING are given, and many interesting quotations from the second (*Lun Hsien*, Essay on the Immortals), the fourth (*Chin Tan*, Gold Medicine), the eleventh (*Hsien Yao*, Medicines of the Immortals), and the sixteenth (*Huang Pao*, the Yellow and the White) of the Inner Chapters of *Pao-p'u-tzŭ*. CHIKASHIGE discusses the identity of some of the materials which KO HUNG used, and concludes that some of the processes may actually have yielded real gold because of the gold which existed in small amounts in the reagents.

The discussion of ancient Chinese bronzes centers around the " Six Recipes of *Chin* " which were set down in the *Chou Li K'ao Kung Chi* (Artificers' Record, the sixth part of the *Chou* ritual) which was published during the *Chou* dynasty in the tenth century B.C. The author concludes that these recipes, except the last one, are reasonable. He discusses the properties of the several kinds of bronze which correspond to them, and finally reports chemical analyses of ancient bronzes in which the proportions of copper to tin agree with those laid down in certain of the recipes. Since one metal in an alloy may oxidize more readily than another, and may even leave the alloy by going into the crust of oxide, thus changing the composition of the residual unoxidized metal, the author wisely made his analyses upon the uncleaned ancient bronze objects, determining the total amount of each metal present in the combined mass of metal and oxidized material.

" As to the method of forging swords in extreme antiquity, no history nor tradition has been handed down ; but some of the straight swords excavated by archeologists were once submitted to investigation from which it may be concluded with some justice that they belong to the class of forged swords. For they showed some signs of having been forged by " folding," or even by " combining " different sorts of iron. The art of forging made great progress when in the days of the Prince Regent SHŌTOKU (573-621) it was taught by some naturalized smiths

at Oshinumi and later when Emperor GOTOBA (1180-1239) gave directions to the noted smiths of the various provinces and made them forge at the court. All this concerns the method of forging the so-called *kotō* (old swords) but this method was lost during the age of civil wars towards the end of the *Ashikaga* Period. *Shintō* (new swords) made their first appearance towards the beginning of the *Tokugawa* Period and during the *Anei* (1772-1780) era or thereabouts *shinshintō* (new new swords) began to be turned out. A sword-smith, named SUISHINSHI is said to have been the originator of the *shinshintō* school. He was a diligent investigator of the oldest school of sword forging, and thus the once obscured method became clear again ; but it did not live long as such, for SUISHINSHI improved it further and gave birth to a new school. The doctrine of the school of *shinshintō* still survives among the sword-smiths of the last days of the *Tokugawa* Period."

The author describes the methods of the *shinshintō* school, having procured his information from the notes of two who were instructed by master sword-smiths. The descriptions are clearly illustrated by diagrams, and the effect of the process upon the structure of the metal is made evident by micrographs of cross-sections. Micrographs of cross-sections of ancient Japanese swords, and of much inferior swords from Java and Formosa, show plainly the manner in which they were forged.

TENNEY L. DAVIS.

Duncan Black Macdonald. — *The Hebrew Philosophical Genius*. X + 155 pp. Princeton University Press. Princeton 1936 ($ 2.50).

The ancient Hebrews have given the world religion ; but were they also capable of philosophy ? This question has been variously answered. There are those who deny the Jews the philosophic genius. All philosophy starts in doubt. It is the fruit of the searching, peering, questioning and sceptical attitude. It is a revolt against the formal, ceremonial and conventional order, when the soul feels itself impelled to blaze new trails and create new ways and methods of thinking. To the ancient Hebrews, however, everything was arranged, ordered and prescribed, leaving little room for the free and unhampered play of the intellect. In such an atmosphere there is little encouragement for that quality of mind and thought which goes by the name of philosophy. Where there is much restriction there is no room for freedom, and where everything has been provided and settled by divine legislation individual initiative withers and philosophy can find no home. This is the reason why, while there is much theology in the Old Testament, there is little philosophy, and while its pages fairly bristle with thought-provoking ideas, there is no such well-ordered system of thinking as one finds in

the literature of the Greeks. The Jewish genius, it is maintained, is incapable of philosophy. It is mystical, ecstatic, emotional, reflective, introspective and contemplative, but not analytical. It lacks that independent attitude which alone gives philosophy its worth and value. Whatever philosophical elements there are in the Bible, it is charged, are not the fruit of the genius of the Jew, but the result and consequence of the interplay of foreign forces and influences, first in Palestine and afterwards in Alexandria. It was this clash with foreign cultures and civilizations that has given to the Old Testament the books of Job and Ecclesiastes, and to the Apocrypha the works of BEN SIRA and the Wisdom of SOLOMON, besides several other treatises. In later centuries, it was the contact with Arabic culture that helped to widen and enlarge the Jewish horizon, and produced a veritable constellation of thinkers and philosophers.

Comes Professor DUNCAN BLACK MACDONALD, an outstanding authority on almost every form of Semitic studies, and in a closely and admirably written book, *The Hebrew philosophical Genius*, which he modestly announces as a supplement to his larger work, *The Hebrew literary Genius*, but which, in truth, may be regarded as a strikingly original and independent contribution, lifts a lance in vindication of the theory that "the Hebrews had fundamental philosophical ideas and attitudes; that these were theirs from their beginning; and that the more formal expression of these reached in such later books as Job, Proverbs, Ecclesiastes and Ecclesiasticus came by an orderly development from such beginnings." This is directed against the very common view that the writers of these books had come under Greek influence and had been affected by Greek philosophy. The ancient Hebrews, Prof. MACDONALD maintains, had a well-defined philosophy of their own although they may have lacked the terminology. Although lacking the form, they preserved the substance of an independent Hebrew way of thinking that was entirely their own, uninfluenced by any other race or people.

Prof. MACDONALD states that, in contrast to the Greek method of thinking, Hebrew philosophy is centered around a Personality that is strong, absolute and self-willed. That personality is Jehovah, who both dominated and quickened the thought of the Hebrew people. Jehovah was to the Hebrews not a theory, an abstraction, or a logical deduction, but a fact of experience, a stupendous and overwhelming fact. This Personality of Jehovah may have been later anthropomorphasized, but was a fact none the less. The personalized Jehovah was to the Hebrews not a tyrant, a despot, an autocrat, regarding man as the puppet of His every whim and will, but a kindly, gentle and tender

guide and teacher, useful and helpful for the carrying out of the commands of the Torah, by the obedience of which alone prosperity and happiness was possible.

Now, to the Greeks, Zeus, too, was conceived as a personality, but he produces no such moral or emotional reaction as does the Personality of Jehovah for the Hebrews. And it was this conception of Jehovah as a Personality that was, according to the author, responsible for the fervor and passion of the Hebrew Bible. While the poems of Homer and Hesiod may amuse and entertain, and even enlighten, they fail to create that spiritual atmosphere which is inherent in the Old Testament. The Greeks were not strangers to emotion, but it was patriotic rather than religious, intellectual rather than spiritual; it failed to enter into the very fiber of their being.

Because the Hebrews conceived of their deity as a Personality, the author feels, Jehovah was to them a dynamic, not static, Deity, His attribute being Becoming, not Being. He was to the Hebrews a living creative force, an *élan vital*, and not a fixed, rigid and immobile philosophical concept. Motion, not rest, is His quality. He is often also a changing and adjusting Deity who makes circumstances His guide and rule of conduct. The writers of the Bible are not embarrassed to make Jehovah change His mind, and say that God had "repented Him." This conception of Jehovah as a changing Deity may prove dangerous to the indiscriminate reader. For, if God changes, if He is not the one unchanging Reality of life, what becomes of the surety of our faith, the confidence and certainty of our belief? What of the fine biblical metaphor which conceives of God as the unchanging Rock? Would it not be much more in keeping with the Old Testament ideal of Jehovah to make change a manifestation or attribute, rather than the essence of His Being? But however misleading Prof. MACDONALD's statement of Jehovah may be, it is one which will find only too ready acceptance on the part of the modernists, both Jews and Christians.

Because Jehovah was to the ancient Hebrews a great and stupendous Reality, and that Reality was dynamic, not static, Life had for the Israelites a much deeper meaning than for most of the races and nations of antiquity. In the author's own fine phrase, "The Hebrews, just because of the importance which they ascribed to personality, were masters of the science of living. They watched its currents flow in themselves and in others; they saw the thing Life behind the constant and multitudinous changes of living." Nowhere is life spoken of with such passion and fervor as in the pages of the Old Testament. "Behold, I lay before ye life and death, choose ye life that ye may live."

The Hebrews had their problems of Jehovah, and perhaps the greatest

of these was the problem of evil. Many of the Bible authors had grappled with it — Job cynically and sceptically; Ecclesiastes with a touch of pagan humor; and the books of the Apocrypha had to devise a whole complicated system of reward and punishment to explain the essence and presence of evil. But more simple, if naive, were the Palestine thinkers on the subject. To them evil was simply a matter of stupidity. The sinner is a fool, the wicked a blunderer, "The fool hath said in his heart, There is no God."

Unlike the Greek conception of Zeus, which makes him out an unrelenting deity, with man nothing more than a mere puppet in his hand, Jehovah experiences His rival in Hakmah, commonly translated, Wisdom, but which the author renders as Reason. Reason makes man more than a puppet, or in the author's fine phrase, "a puppet with something in it". The Presence of Reason makes of man a moral being often standing even outside the control of Jehovah. He has a life of his own, and is dowered with the capacity to exercise it. The Hebrews may have had no word for conscience, but the Bible is everywhere conscious of its presence. Reason is the intermediary between God and the world, and in the so-called Hakmah literature of the Hebrews, it has been personified as Jehovah had been personified. Its appeal to the Hebrews is, "Be rational and ye shall prosper." In the Old Testament, Reason is the dominant note in the books of Proverbs, Job and Ecclesisastes; in the Apocrypha it is to be found in BEN SIRA, the Wisdom of Solomon and Enoch, but everywhere its function is as a guide, helper, teacher and mentor of man.

With rare learning and analytical detail, Prof. MACDONALD devotes several chapters to an examination of the Wisdom literature of the Hebrews, sketching its rise, tracing its development, and dwelling upon the Palestine and the Diaspora elements in it. The author finds that, whereas the former was free, spontaneous and creative, springing from the very spirit and essence of the Hebrew genius, the latter was the result of a compromise between Zeus and Jehovah, between Hellas and Palestine, between the Hebrew and the pagan attitude. The rational outlook of the ancient Hebrews was not limited to the Wisdom literature; their independent thinking had neither originated nor ended with it. There is a seasoned view of life to be found in almost all the writings of the Old Testament. The early chapters of Genesis bear witness to it; in Jonah and the Psalms one meets with the evidence of struggle and protest, and traces of the enlightened Hebrew outlook are noticeable almost everywhere. It is, however, in the literature marked as Wisdom, where Reason, or the rational relation between God and his people, is particularly emphasized.

While the monistic tendency of the Hebrews is faithfully adhered to in this form of literature; while the revelation in the Mount is taken for granted, and there is no shadow of doubting the great and overwhelming Personality of Jehovah, the driving force of the books of Wisdom, especially those of the Diaspora, is not Hebraic but Hellenic, or a curious mixture of the spiritualizing mythology of both Greek and Hebrew, reaching its climax in the amazing imaginative speculations of PHILO and the other thinkers of the Alexandrian school.

The Wisdom literature of the Diaspora was a kind of bridge the Jews of Egypt had built in order to bring their sacred books to the level of contemporary thinking, to reconcile the sane and realistic mind of the Hebrews with the equally sane and realistic mind of the Greeks. Allegory, that strange theologico-philosophical abstraction of the Alexandrians, was the child of the mixed marriage of the Hebraic and Hellenic ideal. It suited their temperament, it answered their needs; it was the apology of the Jewish faith in a non-Jewish world. In the hands of PHILO and the other writers, it even developed into a fine art with often amazing results. Allegory, when unchecked, will run wild, and this is exactly what happened to the Philonic interpretation of the Bible. "Philo," says Prof. MACDONALD, "really annulls the historic fact; the allegory that for him lies in it is his fact." The history of the Hebrew people may have been real for him, but it was also for him spiritual, and hence subject to allegory. Pseudo-philosophical abstractions took the place, and even superseded, the cold and stern requirements of the Law. The Jewish horizon may have been widened in this way, but it was an enlargement that led away from the old Hebraic ideal and not toward it. The door was left open to all sorts of wild and unbridled speculations which made PHILO a pillar of the Church instead of the synagogue. All these things have their interest for the student of Jewish history and literature, but they are symptoms which mark the decline and decadence of the Hebrew philosophical genius, and not its strength and vitality. For the latter, one is to look not to Alexandria, but to Palestine where the Hebrew genius was free, creative and spontaneous, expressing itself in such works as the Proverbs, Job, Ecclesiastes, and many of the Psalms.

It is a splendid performance that Prof. MACDONALD has rendered in *The Hebrew Philosophical Genius*, the crowning achievement of a lifetime devoted to Semitic studies. Patient research is wedded to unbiased scholarship, and great learning to felicitous writing, which, once mastered, will not be forgotten. He has blazed a trail which, it is hoped, others will follow. There are keen philosophical and psychological observations strewn all over the book which, besides their depth and originality, will be read and admired for their sheer beauty of style and expression.

Prof. MACDONALD's earlier work, *The Hebrew literary Genius* (1933), reviewed by G. SARTON in *Isis* 21, 316-9, has been enriched by this "supplement," as has also been true scholarship in a field in which the author has few equals.

JACOB S. MINKIN

Charles J. Brim. — *Medicine in the Bible.* xix + 384 pp. New York : FROBEN Press, 1936, ($ 5.00).

The literature relating to the medically interesting parts of the Pentateuch is extensive and various, and for the most part is based on the vernacular text, whether English or any other modern language; the early patristic references to the subject were, of course, based on the Latin or Greek texts. It is to-day fairly commonly understood that there exists no completely faithful translation of the Pentateuch; the King James version, with which most of us are familiar, is excellent enough as a literary translation, but it abounds in mistranslations and errors which completely alter the sense or obscure the meaning of many of the original passages. This has had many untoward effects, and in the enormous literature which has grown up about the Bible the Pentateuch is often made to bear the burden of ideas which are not to be found in the original; the form, to give an instance of perhaps the most notorious case, in which our jurists customarily explain the concept of the *lex talionis*, "an eye for an eye, a tooth for a tooth," as it is said to be expressed in the Bible is not to be found with the meaning so given it in that work, where the *value* of an eye is awarded for the loss of an eye, and the *value* of a tooth for a tooth, not the organ for the organ as such.

In the present work the author has gone to the original Hebrew for his text, and for his commentary he has gone to the exegetical writings of RASHI (the penname of Rabbi SCHLOMO IZCHAKI (1040?-1105)) to the strict letter of the word, *p'schot*, of which he adheres, dispensing, for the most part, with other authorities, and for the rest causing his own medical knowledge to do good exegetical service, and thus provides us with a running commentary on all matters of medical interest contained in the Pentateuch. There are relatively few references to other works or writers, and these are generally of a pedestrian nature, hence, when Dr. VICTOR ROBINSON in his introduction to the book refers to the author as "the American Rashi," we may take this to define the author's achievement as a commentator on the medical aspects of the Pentateuch after the manner of RASHI. This is not the author's claim, as we have said, what he gives us is RASHI's commentary in addition to the benefit of his own medical commentary, but unlike RASHI he makes little use of the judgment of others, and this may by some readers

be regarded as a defect of the book, but on the whole, and particularly by those who have misspent a considerable portion of their childhood and youth in the unready study of the writings of the Rabbis the book will arouse memories of hard-etched benches, of *cheddar* (*not* as in the cheese), of candles which, unlike Miss MILLAY's did not give a lovely light, and perhaps of cat-o'-nine-tails, and snuff, and gargantuan sneezes, and the zenith of the casuist's art, the *pilp'l*, to such and to others the book will be acceptable in something of the limited sense indicated, shall we say "as far as it goes," as complete in itself.

Since as a commentator RASHI was brilliant, learned, and sound, and since Dr. BRIM is a well-equipped medical man with a good knowledge of Hebrew, *Medicine in the Bible* makes extremely interesting reading. Dr. BRIM writes well and clearly, though his writing is occasionally disfigured by Americanese expressions which are unnecessarily distinguished by an utter banality; if one has a proper sense of humour one smiles, if one has not one is likely to be irritated. Perhaps Dr. BRIM may be persuaded to desist from this kind of funniness in the further writings which he promises to give us, and which it is to be hoped we may soon have, on the Medicine of the Prophets and of the Talmud. When Dr. BRIM speaks of "the Mosaic Administration," "the Mosaic Health Board," and "that schoolgirl complexion," or when he explains that "the Greeks had a word for it," or that certain Mosaic prescriptions remind us of notices on the subway, or of modern dental advertisements our supracilia are involuntarily depressed.

Dr. BRIM writes as an enthusiast for MOSES and the Mosaic Code. In a biographer enthusiasm for his subject is good, but in a scientific appraisal of the works of a man a dispassionate critical attitude is better — and safer. Dr. BRIM is a little too uncritical, and in his admiration for his hero he rather overdoes "the great scientific mind of MOSES," yet for all that he performs a valuable service in putting MOSES in something of a new and convincing light as a really great innovator of laws and reforms of great intelligence and reasonableness, though, we would suggest, they were hardly of a scientific nature. If MOSES made use of any method then it was the method of crude deduction, there is nothing to be gained by calling it more than that, it was brilliant and helpful in its day, and that is good enough. MOSES as a guardian of his people's health was an empiricist, and in an age ruled by magic and superstition that in itself was an enormous achievement.

In his enthusiasm for the Antique Dr. BRIM often allows his judgment to become submerged beneath the onrush of that enthusiasm. For example, in discussing the ancient models of the liver which were used in *hepatoscopy* he quotes STIEDA (p. 68) as saying that these examples

of anatomical illustration in three dimensions are far superior to the five-lobed livers of the *Tabulae Anatomica* of VESALIUS, (*Cf.* L. STIEDA, *Über die alt Bild-Dar d. Leber*, Anat. Heft., Bd. XV, 1900, 673-720), a statement which is quite unjust for these models are never anything more than stylized animal livers, generally of sheep, so stylized, indeed, that it took later generations many years before they were recognized to be what they were. The five-lobed livers of VESALIUS are perfectly accurate representations of the human liver and are far superior to any representation of this organ which had previously been attempted. On the same page Dr. BRIM states that the first description of the adrenal glands was actually given in the Bible, and not as has hitherto been considered by EUSTACHIUS in what Dr. BRIM refers to as his *Opuscula Anatomica Venetiis* (1563) *(sic)*. Dr. BRIM maintains that EUSTACHIUS took his description of the adrenal gland from the Bible, and he points out that PETRUCCI had in 1675 accused EUSTACHIUS of doing so. Dr. BRIM bases his statement on the Hebrew text which reads thus, "And the two kidneys, *k'loyess*, and the fat that is upon them." (Lev. 3 : 4; 10, 15; Exo. 29 : 13, 22). "The fat that is upon the kidneys" he says "is what the Scripture calls the adrenal glands." (p. 69). It may be so, but we are strongly inclined to doubt it, and until Dr. BRIM is able to produce better evidence than this, it were better to call "the fat that is upon the kidneys" by its modern name, the *pararenal* fat, and still credit the original description of the adrenal glands to EUSTACHIUS.

In a valuable chapter on *Venereal Diseases* Dr. BRIM writes, "The form of venereal disease described in the Bible that is often referred to is the local urethral condition of gonorrhea, which is called *zov*. Constitutional syphilitic disease, which has not been recorded in any of the works of antiquity, is described in the Bible under the heading *magepho* or venereal epidemic. Why scholars have neglected this episode and point to the great epidemic of syphilis at the end of the fifteenth century as its origin we cannot understand." (p. 150). Dr. BRIM is apparently unaware that SUDHOFF long ago produced evidence to show that syphilis was certainly in existence in Europe in the 12th Century of our era. Dr. BRIM, however, makes out a very suggestive case for the existence and recognition of syphilis as a venereal disease in Biblical times. At the time of the *magepho* the genitals were recognized as the sites of the initial lesions through which venereal infection takes place; ulcers, scars, and condylomata were associated with the disease, and Dr. BRIM points out that the presence of saddle nose among the Biblical peoples is not without its significance. In the Biblical account of *magepho* given in *Numbers* 22-31 Dr. BRIM sees evidence of epidemic syphilis. That the disease was a venereal one and re-

cognized as such there can be not the slightest doubt, and that it was epidemic syphilis is possible. In the nature of the case this is not a matter which can at present be proven, Dr. BRIM makes out a very good case, and it is one which will have to be taken into consideration in all future discussions relating to the history of syphilis.

It is hoped that something of the nature and contribution of this valuable book has been indicated. The illustrations are well chosen, though in most cases their sources or provenance are not given; the original Hebrew words and phrases are transliterated without benefit of the very necessary diacritical marks; there is no list of references, the index is good, and the make-up of the book excellent. RASHI might well be proud of his follower.

New York University. M. F. ASHLEY-MONTAGU

Julian M. Drachman. -- *Studies in the literature of natural science.* xii + 487 p., 6 pls. New York, The MACMILLAN Co., 1936. Price $ 4.00.

The title of this work does not reveal its historical scope and content. It is neither a comprehensive survey, nor an illumination of the peaks along the mountain ranges of evolving scientific knowledge. It is rather a selection of movements, incidents, and men, dramatically presented by the writer. His discussion of "what, if anything, is scientific literature?" leads to the conclusion that this literature, as distinct from other forms of writing, did not arrive until the 19th century, when, in English, it became a characteristic of the Victorian period, and then largely in the field of the natural sciences. The writings of DARWIN and HUXLEY exemplify this, the first a model of dispassionate clarity, the second, of forceful argument. A questionnaire on the topic of the book answered by twenty-five representatives of literature and science reveals about as many diverse opinions. However, the author is convinced of the growing improvement in the literary qualities of modern scientific writing. The real ground for this, it seems, lies in reality in the fact that the natural sciences all deal more or less directly with life, the curved lines of beauty in organic form, the dramas of fleeting existence, and the interplay of individuals and environment on the stage of life. The true biologist is in reality an artist under restraint of truth.

One historical asset in this work is a presentation of certain themes not usually developed in histories of biology. Among these are the anticipation of Darwinism by WELLS, the South Carolinian physician; the writings of ERASMUS DARWIN; the *Vestiges of Creation*, attributed to ROBERT CHAMBERS; the tragic career of HUGH MILLER, author of *Footprints of the Creator* and other works of reconciliation ; an analysis of

the views and influence of OWEN and SPENCER; a well-worked-out account of the writing and reception of the *Origin of Species*; an analysis of the literary style of DARWIN and HUXLEY; and a discussion of the literary popularizers of science, including BACON, VON HUMBOLDT, WHEWELL, FARADAY, TYNDALL, SPENCER, DRUMMOND, FISKE, the naturalists, WALTON, WHITE, WATERTON, RICHARD JEFFERIES, W. H. HUDSON, BELT, and the Americans, AUDUBON, THOREAU, BURROUGHS, and MUIR.

The author's treatment of BUFFON exemplifies the modernistic tendency to assassinate character in giving play to psychoanalytic efforts in support of a thesis. Throughout the book the feature of scientific controversy is emphasized and "played up" to the limit. Poor "Buffoon" is the first and foremost victim. The reader is left with the impression that he was a coward, a favorite of the ladies of the court, and, all in all, a despicable, jealous, pompous parasite. The translator of NEWTON's *Fluxions*, however, was a constructive genius who visualized nature as a dynamic system, conceived the living world as a scale of being which his *Histoire naturelle* portrayed in its changing environment. His revision of views in cosmology before the Sorbonne is interpreted as cowardly, and his subsequent elaboration of his views on evolution as trickery. It may be that BUFFON who was primarily or at least at first deeply interested in mathematics, numerology, and the physical sciences, was too honest to be dogmatic on theories of evolution which he knew lacked the elements of precision more evident in the inorganic field with which he had long been familiar.

CHARLES A. KOFOID

J. G. Crowther. — *Soviet Science*. x + 342 p., 16 pls. New York, E.P. DUTTON & Company, 1936. Price $ 4.00.

The author has been the scientific correspondent of the *Manchester Guardian* for ten years in the course of which he has visited the U.S.S.R. seven times, in 1930 having been invited as an official adviser on technical education to the Supreme Economic Council. The material for this book is quite up to date, however, having been gathered during the winter of 1934-1935 when the author was a guest in the institutes of NIS, the Scientific Research Sector of the Department of Heavy Industry, and of *Voks*, the Society for Cultural Relations with Foreign Countries. All of the 21 institutes described in the book have been visited by the author and their lines of investigation surveyed and discussed with the scientists in responsible charge. The presentation therefore is authoritative and comprehensive, at least for European Russia.

The author opens his treatise with a presentation of the dialectical

materialism of the Soviet regime, without an understanding of which he infers the reader will fail to grasp the full significance of the scientific program of the U.S.S.R. A few quotations will present this concept :

"The dialectical materialists regard all theories of change which derive their conception of the mechanism of change, like Darwinism, from the continuous Newtonian mechanics, as 'mechanistic.' In this sense, then, they are anti-mechanistic... They do not feel the dilemma of NEWTON and his followers, who required a First Cause to set the whole machinery in motion.

"The difference between HEGEL and MARX lies in their conception of the substance in which the dialectical process of thesis, antithesis and synthesis works. HEGEL supposed that this substance was ideas. MARX said that the true substance in which they operated was the material out of which the world is made. Thus the process of world development was the dialectical evolution of material; dialectical materialism...

"The origin of man is found in the pre-human animal world, which is the thesis. The beginning of the human type arises as the antithesis out of the thesis. In the struggle between the animal world, the thesis, and the newly arising human type, the antithesis, the definitely human type is produced, the synthesis.

"With the appearance of the synthesis, the human being, human society comes into existence, and simultaneously with the appearance of human society, various contradictory movements begin in it, forming a number of theses and antitheses leading to new syntheses.

"The conception of the development of human society as motivated by struggles between classes fits directly into the dialectical materialist philosophy...

"In dialectical materialism theory and practice are inseparable, and neither has scientific meaning without the other. This leads to what is named the unity of theory and practice, and provides dialectical materialism with the strong without the weak features of pragmatism. It gives dialectical materialists a proper appreciation of the importance of experiment in natural science."

The author then reviews the bases and methods of organization for physical research, describes the reorganized Academy of Sciences now transplanted from Leningrad to Moscow with a doubled membership and about 4000 scientists more or less under its supervision. A description of the Scientists' House, the former grand ducal palace, presents some inviting and some uninviting features.

The body of the book is filled with a detailed account of the 21 institutes for investigation in physics, chemistry, and biology; the lines of investigation planned and under way in each; the results thus far accomplished; and the staff with the subdivisions of program among them. The reader should refer to the book in order to gain an adequate impression of the magnitude of the enterprises undertaken, the adequacy of the basic concepts underlying the program, the extraordinary diversity of the projects outlined, and the evaluation of the output.

The reviewer gathers these impressions from the author's presentation :

Basic principles are clearly conceived and govern the direction of all the major enterprises. In this respect the plan approaches the ideal. This is combined with a dominating emphasis on the practical applications of science in industry, agriculture, medicine, sociology, and politics. There is evidence of sincere effort to provide adequate equipment, staff, and direction. There is also evidence of organization verging on regimentation in living conditions, program, supervision, and directed lines of investigation. Undoubtedly this will tend to keep many investigators busy, and will insure some results along definite lines in a minimum time. Its ultimate success as a complete program seems to rest upon subtle factors, for which evident provision seems not to have been and probably never could be made. One of these is the prod of competition, a minor but immediate accelerator of individual effort.

So long as this is political in purpose or derived from class consciousness merely it lacks the universality of science. Possibly growth will remedy this limitation. The most uncertain of all factors appears to be that of freedom in an atmosphere of directed research. Will the practical ends sought, the directed program, and the fixed associations allow sufficient freedom for the creative imagination to roam at will in the realm of new ideas? Can great ideas grow, or be produced to order with the precision of directed hybridization, or that of a planned chemical combination? In the part played in Soviet Russia by the system of conferences described by the author there appears to be a place for discussion and criticism, provided this remains vocal and untrammeled. The philosophy of dialectical materialism appears to call for the clash of opinion, for thesis, antithesis, and synthesis. The real question is as to how far the last two members of the trilogy will progress after the first. Signs are not wanting in this challenging book that this problem is being faced frankly in the scientific organization of the U.S.S.R.

CHARLES A. KOFOID

Florence A. Yeldham. — *The teaching of arithmetic through* 400 *years*, 1535-1935. 143 p., frontispiece, facs. London, HARRAP, 1936 (5/).

To Miss YELDHAM we are indebted for an interesting work, *The story of reckoning in the Middle Ages*, published by the same firm as the present work. In a measure the new book is a continuation for England of this "story of reckoning."

The teaching of arithmetic through 400 *years* is an ambitious project for a book of less than 150 pages. In this instance the project is limited

to England and further, by circumstances beyond Miss YELDHAM's control, largely to the selection of books in the Mathematical Association Library at Reading University and in Dulwich College. Naturally these limitations are being taken into account in making this review.

The table of contents, in ten chapters, reads as follows : (p. 7).

1. The reason for studying arithmetic; 2. TONSTALL; 3. RECORDE; 4. HYLLES, WINGATE, OUGHTRED, and JAGER; 5. COCKER; 6. WARD and MALCOLM; 7. VYSE and CHAPPELL; 8. BONNYCASTLE, DE MORGAN, SANG; and others; 9. The exercise book; 10. Arithmetic in recent years; Index.

The prefaces of the arithmetics treated in the first chapter are indeed well worthy of study; in the preface an author so often indicates the guiding star, the ideals which in inspired moments have animated him. Too often there is little evidence of these ideals in the text itself. Miss YELDHAM has well shown how universally the English arithmeticians rejected the purely trade uses of arithmetics to stress the wider application to science. ALEXANDER MALCOLM's observation : "one age may find the use of the theory which a former has invented," has been proved true in almost every advance of physical science. This Scotchman is of international interest, having extended his instruction by books on mathematics and on music and by his own career as a wandering schoolmaster going from Scotland to England and to America. In the New World MALCOLM's activity fell in New York City, where his private mathematical school seems to have been successful.

The importance of TUNSTALL's Latin treatise of 1522 *De arte supputandi*, is properly emphasized; the evidence of its worth is indicated by three Paris editions of 1529, 1535 and 1548, and by four Strasburg editions of 1543, 1544, 1548 and 1551.

The earliest English printed arithmetic, *An introduction for to lerne to reckon with the pen, or with the counters... in hole nombers or in broken...* was popular in England, having six editions between 1537 and 1629; but RECORDE had thirty-odd editions; with 1607, 1608 and 1658 in addition to the 28 editions listed in SMITH's *Rara* between 1542 (?) and 1699. HUMPHREY BAKER's *Well spring of the sciences* having at least nineteen editions between 1568 and 1687 was worthy possibly of slightly more attention.

Undoubtedly the number of editions must be considered in any estimate of a work's importance. On this basis HYLLES of 1600 would not be included, but as one of the earliest in verse it is worthy of some attention even as a curiosity.

Another indication of worth is the republication of a book in another country. In particular the American editions of English works notably extended the popularity in the British Empire.

JAMES HODDER might well have been mentioned for his numerous English editions as well as the first separate treatise on arithmetic in New England, 1719. DILWORTH's *Schoolmaster's assistant* had five American revisions and approximately fifty American editions between 1773 and 1832, in addition to many English editions. Two other books with similar titles, the *Tutor's guide* of CHARLES VYSE and the *Tutor's Assistant* of FRANCIS WALKINGAME had American popularity. The WALKINGAME had four Canadian editions, viz., in 1837 in Montreal, 1838 in St. John, N.B., and 1844 and 1849 in Picton of Canada West.

THOMAS DILWORTH's book and *The instructor, or Young Man's companion* by GEORGE FISHER, "Accomptant" were the two most widely used arithmetics in America from 1748 to 1802 and continued in use in America for another third of a century.

JOHN BONNYCASTLE and CHARLES HUTTON were two English writers whose influence became effective in America in more scholarly arithmetic, algebra, and geometrical treatises issued between 1786 and 1850; both men were also of great importance in the progress of arithmetic as a science in English schools.

The *Exercise Book* is indicated by Miss YELDHAM as an early nineteenth century innovation. Possibly this device to keep children busy was an American innovation, as there are even seventeenth century specimens found here in New England. The headings of special sections were written, usually with many flourishes, by the teacher; possibly early writing master arithmeticians like COCKER inaugurated the custom. We have at Michigan eighteenth century French specimens and eighteenth and nineteenth century American. I have seen Australian and English ones. Doubtless they flourished all over the world, and could even to-day be located in remote districts in rural England and America.

As we have so many editions of arithmetics in the Michigan Universiy Library and as I have occupied myself with an attempt at locating all English arithmetics and algebras to 1800, I have given possibly overdue emphasis to bibliographical phases of this work.

Miss YELDHAM's book is a fine study of the progress of arithmetic material in England and may well serve as a model for further studies of the progress of learning in the schools of many other countries. The work reveals also the need for far more precise information about the totality of arithmetics which appeared in England and elsewhere, both as to titles and numbers of editions in the periods under discussion, as such studies are absolutely essential for any complete study of the "teaching of arithmetic through four hundred years."

(University of Michigan) LOUIS C. KARPINSKI.

Donald Culross Peattie. — *Green Laurels. The Lives and Achievements of the Great Naturalists.* xxiii + 368 p., 30 pls., 5 figs. in text. New York, SIMON and SCHUSTER, 1936. Price $ 3.75.

This is "green laurels" twined by a lover of nature about the brows of the great and near great who through their intellectual interpretation of nature's secrets have advanced the natural sciences. The field covered is, in the main, the familiar one of all histories of the natural sciences, but the author does not carry the subject beyond the time of DARWIN and WALLACE, except for the final chapter devoted to JEAN HENRI FABRE (1823-1915), the latest of the great French naturalists. The recipients of the laurels are the schoolmen and herbalists of the Renaissance; the early microscopists, MALPIGHI, SWAMMERDAM, and LEEUWENHOEK; the naturalists of the most brilliant court of France, BUFFON and RÉAUMUR; LINNAEUS and his school; CUVIER, the anatomist, and LAMARCK, the dreamer; the plantsmen of the American wilderness, BARTRAM and MICHAUX; the birdsmen, WILSON and AUDUBON; the frontier Utopians of the New Harmony settlement, SAY, RAFINESQUE, and LESUEUR; the school of the romantic nature philosophers, ROUSSEAU, GOETHE, and RICHARD OWEN, the anatomist; DARWIN and WALLACE, the originators of the *Origin of Species*; and a closing chapter on FABRE, his importance in natural history, and the rôle of the naturalist. The account of the Americans, and the Utopian groups at New Harmony, Indiana, is an especially welcome addition, since most books in the field minimize or omit all reference to the part these men played in the American school of naturalists.

The book is not written in the formal style of the customary historical account of the rise of the biological sciences. It is rather a dramatic display of the achievements and foibles of great men of the natural sciences and the part they played in the culture of their own and later times as executed by a fertile and romantic imagination instead of by the painstaking elaboration of scholarly minutiae. This method has its dangers. One finds an example in the author's portrayal of BUFFON who is made to appear as a jealous, pompous, rather cowardly satellite of the court rather than a writer and organiser with a serious purpose and a definite program governed by the concept of the unity of nature, and with an open mind on the problems of evolution, one frankly cognizant of the theoretical aspect of all evolutionary ideas of his own time. He was too much of a physicist and mathematician to be misled into futile argumentation. There are interesting portraits of the early Americans, and a well selected list of pertinent books.

July 15, 1936. CHARLES A. KOFOID

F. W. T. Hunger.—*The Herbal of Pseudo-Apuleius*, from the ninth-century ms. in the abbey of Monte Cassino [Codex Casinensis 97] together with the first printed edition of JOH. PHIL. DE LIGNAMINE [Editio princeps Romae 1481] both in facsimile, described and annotated. With two portraits. Leyden, E. J. BRILL, 1935. Large folio (43 × 56 cm.), xlviii + 168 p. (120 facsimile). Limited ed. of 200 copies. Guilders 75.

1. HUNGER reproduces in toto two entire documents, marking stages in the series of herbals, the Herbarium Apulei in the 9th century and the 15th century respectively *.

2. No discussion of an "evolutionary" trend is attempted, only the demonstration that the printed book reproduces precisely the MS. text and the pictures of plants.

3. In addition he corroborates the view already expressed that the printed edition of the Herbarium Apulei must have been issued around 1481 and not later as has been asserted.

Ad 1. The reproductions are perfect, on hand-made paper with perhaps a too lavish display of margins which make the almost two feet high volume somewhat unwieldy. Corresponding MS. and incunable pages are facing each other so as to permit easy comparison. No collation nor palaeographic analysis is given, but the excellence of the facsimiles allows one to supply them. A justification of the ascription of the MS. to the 9th century is not undertaken but the palaeographic criteria established by LOEW (*Beneventan script*, Oxford 1914) are evidently accepted although this important work is not cited. That a similar MS. in the same script exists (*Florence Laurent.* 73, 41) ought to have been mentioned because the author attempts to prove that there is "identity" of MS. and incunable. SINGER in "*Herbal in antiquity*" (J. Hellenic stud. 1927, *47*: 39 ss.) had suggested that pictures and text of the incunable were derived from either one of two MSS. in

* A survey of the now available documentation shows that it extends in precise intervals of 300 years from the 6th century to modern times outlining five equidistant periods of craftmanship:

VI. cent. Byzantine craft (Juliana Anicia cod. Vienna Med. Gr. I)
"Dioscorides" Ed. de KARABAÇEK, Leyden 1906.

IX. cent. Lombard-Beneventan (Cod. Casinensis Lat. 97)
"Pseudo-Apuleius" Ed. HUNGER, Leyden 1935.

XII. cent. English craft (Cod. Oxford Bodley Lat. 130)
"Apuleius Barbarus" Ed. GUNTHER, Roxburghe Club, Oxford 1925.

XV. cent. Roman printer (ed. pr. Apuleius platonicus, Lignamine 1480)
"Pseudo-Apuleius" Ed. HUNGER, Leyden 1935.

[XVIII. cent. End of herbal craft. Era of systematization has set in (LINNÉ, DE JUSSIEU). Species and specialization: botany, agriculture, pharmacology.]

British Museum (Add. 17063 or add. 21115) " nearest existing relative of an Anglo-Saxon MS." (11th cent.). HOWALD and SIGERIST in their critical edition of the Apuleius (Leipz. TEUBNER 1927) had concurred in this view. HUNGER recommends with OVID : *Adspicite eu ! nec vanis credite verbis*, well, we have done so and while we find numerous similarities there is not a shred of evidence for proclaiming an " identity " except with words that are vain indeed. There is a certain formal monotony that links tenaciously through centuries certain representations of natural objects, and at best one can speak of a greater or lesser family resemblance. To go further would need a stylistic and art-critical analysis which none of the authors cited have even attempted to make. Whether it would be worthwhile is another question. In fairness to HUNGER we must not omit the statement made by the Roman printer that he used a MS. " recently discovered in Monte Cassino," but as shown already there were two 9th century MSS. of the Apuleius at the monastery and there is no reason to doubt that there were others, later ones, in the same place.

Ad 2. In three parallel columns the MS. text is compared with that of the incunable and with HOWALD and SIGERIST's " standardized text," also some rather interesting contemporary interpolations in the MS. are carefully noted. That some of these latter were taken over by the printer must be considered as HUNGER's strongest argument in support of his claim of " perfect identity." The correspondence of the texts is striking, and the emendations the author sees fit to make to HOWALD and SIGERIST's readings are so trivial in most instances, that one wonders at the worthwhileness of such a long and arduous analysis. That no " evolutionary " changes in the herbal during its run through 600 years should have become noticeable, need not surprise, it is inherent to this kind of " literature." More or less, though we may not be aware of it, we still regulate our lives according to some precepts set forth in the celebrated *Regimen sanitatis* of Salerno. Both the Apuleius and the Regimen are linked to that Duchy of Benevent where " simpleminded but glorious " barbarians had set themselves to extract from imperial ruins what still had life. For the text-critical historian the Salerno school begins to develop a modicum of scientific thought only 200 years after the MS. was written. HUNGER's fine reproductions invite investigation about this earlier " science," even though he would not ask the question himself.

Ad 3. More successful it would seem is HUNGER's conclusion that the printed Apuleius which bears no date, cannot have been issued as late as 1483/4 as assumed by the British Museum Catalogue and many other bibliographers. The book was issued with two different dedicatory

letters from the printer LIGNAMINE, one to Cardinal GONZAGA who died in 1483 and the other to GIULIANO DELLE ROVERE (later Pope JULIUS II). HUNGER gives translations of these letters parallel with the facsimile and also beautifully reproduced photographs of the two dignitaries after the frescoes by MANTEGNA and MELOZZO DA FORLI respectively. Without going here into the details of his argument, he makes it clear that the assumption of a second issue of the herbal with a dedication to ROVERE upon the death of GONZAGA must be rejected because the dedication to ROVERE contains a *terminus ad quem* in speaking of his just having returned from a trip abroad (i.e. 3 February 1482), while the GONZAGA letter bears internal evidence of having been written before that to ROVERE. But there are other reasons in the printing ventures of LIGNAMINE which make the earlier date very certain. I have given them many years ago (1925) and shall therefore not repeat them. HUNGER in his *addenda* makes tardy acknowledgment of them. But while for HUNGER this antedating is only an act of chronological conscientiousness it appears to me more than that. It allows us to establish a not uninteresting link in the evolution of the later herbal series which was inaugurated by the issue of the *Herbarius* at Mainz in 1484, continued by the most significant *Gart der Gesundheit*, the *Hortus sanitatis*, *Arbolayre*, *Grant Herbier*, to those well known *Kräuterbücher* of the "fathers of botany." Historical facts by themselves, as other "facts" in general, matter so very little unless we establish relations between them. For this, especially for the important step from the "dark ages" to the so-called Renaissance, HUNGER'S book provides precious material, way beyond the immediate "Fragestellung" that moved him and for this we must be most grateful to him.

A. C. K.

Joseph Needham. — *A history of embryology.* xviii + 274 p., 16 pls., 40 figs. in text, and 3 comparative chronological charts. Cambridge, The University Press, 1934. Price 15 shillings.

This work is based upon Chapters 1-4 of *Chemical Embryology* (1931) delivered as lectures on "Speculation, Observation, and Experiment, as illustrated by the History of Embryology" at the University of London. It appears here in amplified form. It carries the subject down to 1814 in which year J.F. JOHN'S *Chemische Tabellen* summarized the state of chemical embryology. At this time morphology and physiology were bifurcating and later history of embryology took on new and more varied aspects.

The author justifies the historical discussion, not on grounds of antiquarian values, but on the deeper consideration that the history of

science is a guarantee of its freedom. Mistakes of our predecessors remind us of our own fallibility and their wisdom reminds us that this achievement was not born with us. A knowledge of their processes serves us as a guide. Their theoretical errors, such as the final cause, phlogiston, and preformation, and their practical errors, such as the divorce of speculation from technique in the Hellenistic Age, show us a more excellent way.

The author emphasizes the significance of the relations between scientific thought and technical practice in all attempts to treat the achievements of any period in their true historical perspective. He presents a cogent illustration in the Hellenistic divorce noted above. Greek science was characteristically theoretical because social conventions parted the aristocratic theorizers from the artizan class, including even the artists. Observational science appeared at its best in ARISTOTLE. His writings reflect the combination of the theoretical and observational and open the way for the experimental. This interdependence may also be seen in the preoccupation of the early fellows of the Royal Society with the improvement of trade and husbandry. The appointment of ROBERT HOOKE as Curator of Experiments was not primarily in the interests of experimental science—witness his many inventions. Even CANGIAMILLA's *Embryologia Sacra* (various editions from 1745 to 1775) had their inception in the sacerdotal rites of the Catholic Church. Not a little discussion over the respective functions of the two sexes in reproduction and the origin of the breath of life had philosophical and religious implications. Perhaps the overthrow of the spermists and cytological proof of the equality of the sexes in the cytological basis of heredity afford the philosophical basis of the modern feminist movement with its struggle for the ballot, and legal and industrial equality.

This is the type of historical work which requires a treatise even to present it in outline, and much more to represent its scholarly, critical, and comprehensive content; undoubtedly one of its finest features is the complete picture presented of ARISTOTLE's work in embryology. This work is not so much a matter of developmental or structural analysis, as of the relations of his discoveries to his own philosophical and biological ideas and to those of his predecessors and followers. ARISTOTLE's work gave a new coherence to embryology. He not only actually carried out the serial observations suggested by the unknown Hippocratic embryologist, but he also added the disciplines of classification and correlation of observations. He studied the embryology of a variety of living forms, introduced the comparative method, enlarged the outlook by noting holoblastic and meroblastic development of ova, ovoviviparity, and viviparity. He contrasted primary and secondary sexual characters,

and traced sex determination back to early embryonic stages. He even correlated regeneration with the embryonic state. In his philosophic analysis of previous speculations he saw clearly the distinction and conflict between preformation and epigenesis and marshaled his evidence in proof of the latter. His concept of the egg was that of a mechanism ready to move in an orderly fashion when once the master lever had been released, although he had no observational evidence on the nature or even the existence of fertilization. He noted that universal characteristics, such as we now regard as those of the phylum or class, appear in the embryo before those of finer categories. In this and in his speculations on the order in which souls came to inhabit the body during its embryonic life he dimly foreshadowed the recapitulation theory. His analytical sense detected the more rapid growth of the cephalic end of the embryo, an anticipation of the idea of the axial gradient. The umbilical cord and placenta were correctly interpreted by him as to their respective functions. Most remarkable of all, without any knowledge of chemistry, he likened the phenomenon of embryonic development to the action of yeast and rennet, thus foreshadowing the idea of organic catalysts.

His mistakes in matters involving biological interpretation and principles were remarkably few. Knowing nothing of spermatozoa and influenced by Platonic ideas of the philosophical significance of form he held that semen supplied nothing tangible to the female, only an immaterial breath which gave form to the menstrual blood. His concept of the scolex or immature worm due to an egg laid too soon was wholly wrong. Misled by the behavior of perhaps imperfectly castrated animals he failed to ascribe the true function to the testes.

ARISTOTLE's insistence on final causes in addition to efficient ones led to the engrafting of teleology onto the biological sciences for more than a millennium and it even emerged in HARVEY's classic treatise, though BACON, despised by HARVEY, had demonstrated that from a scientific point of view the search for the final cause was pernicious. It was not until the 17th Century in such works as GLANVILLE's *Scepsis Scientifica* that the transition from teleology arrived. SPRAT's *History of the Royal Society* (1670) reveals the stormy conflict between the "new experimental philosophy" and the old "Aristotelian school-philosophy" which raged among the members of that organization. Aristotle used teleology "as a heuristic aid, but he never *rested* upon it. The trouble was that he introduced it into the discussion at all. It is an interesting speculation to consider what would have happened if the first great biologist had not brought final causes into his teaching; perhaps the subsequent history of biology, and science as a whole, would have been very different. For final causes irresistibly led to the theological blank

alleys into which men's thoughts were ushered and there left to grope till the end of the Middle Ages." Teleology, like other varieties of common sense, is useful, and, like BOYLE, who meditated on the final cause of valves in the veins, biologists are prone to use it. ARISTOTLE "himself knew how to change rapidly from metaphysician into physicist and back again, how to bow politely to the final cause and press on with dissection; but the later Peripatetics had no knowledge of this art, nor had the Patristic Doctors, nor the mediæval Aristotelians, who all remained sleeping quietly in the shade of the will of God."

The first chapter of the book treats of "Embryology in Antiquity," the second of "Embryology from GALEN to the Renaissance," the third of "Embryology in the Seventeenth Century," and the fourth of "Embryology in the Eighteenth Century." WILLIAM HARVEY (1578-1657) receives ample but seemingly a little less sympathetic treatment by the author. His embryological work is continued not only in his *De Generatione Animalium* (1651) but also is scattered through his *De Motu Cordis* (1628). HARVEY worked with "perspectives," i.e., sample lenses of very low power, making observations on the embryos of the chick and the deer. As physician of King CHARLES he had daily opportunity of observing the uteri of does. His major contributions were the doctrine *omne vivum ex vivo*, antedating REDI's (1684) refutation of spontaneous generation by nearly a century, and maintaining that even vermiparous animals had eggs and that excrement never generated them. He plainly supported the idea of epigenesis for sanguineous animals, arguing against the validity of preformation. He destroyed once and for all the foundations of the Aristotelian (semen-blood) and Epicurean (semen-semen) ideas of embryogeny, although they lingered on to disappear finally in STERNE's *Tristram Shandy*. He derived the embryo from the cicatricula and demonstrated the unreality of the idea of nutritive and formative parts of the egg. He had clear concepts of growth and differentiation, the nature of the placenta, the normal physiological activities of the organs of the foetus, and some sound views on its respiration. But he did not free himself from the past. He wasted pages of laborious argument over unprofitable Aristotelian dogmas, among them that of an immanent spirit, a sort of divine legate controlling differentiation. He opposed atomism and "chymistry" and thus set his followers at variance with those of the DESCARTES-GASSENDI tradition.

In the closing chapter the author discusses in general terms, applicable to science as a whole, the influences which have operated in determining the historical development of embryology. The history of science is not that of a succession of geniuses, as some claim. The investigator

is the inheritor of the thought of generations and also the child of his time. The limiting factors in the historical development of embryology, any one of which may determine the rate of progress of the whole, he visualizes operating as though in a reaction chain. These limiting factors are the mental atmosphere, the ruling ideas in social and political circles, class structure and the scientist's position as an economic unit, the coöperation of scholars with resulting stimulus and criticism, and technique including both material and mental methodology. In material methodology are included preservation and fixation, the microscope and microtome, and the experimental methods of grafting and other forms of mechanical interference. In mental methodology fall a unified terminology, congruent concepts of natural phenomena, audacity (or perhaps a better term is creative imagination), free criticism, freedom from the bias of ethics and religion or respect for the edifying and neglect of the unedifying, and a delicate balance of speculative thought, accurate observation, and controlled experiment. At present we have a plethora of observations and experiments but an embryology threadbare "without one single unifying hypothesis."

Biology needs just such a historical survey as this in every one of its varied disciplines to give stimulus by affording a perspective of accomplishments, a synthesis of progress made, and a criticism of values.

CHARLES A. KOFOID

Essays in Anthropology Presented to ALFRED LOUIS KROEBER. Edited by ROBERT H. LOWIE. xxiii + 433 pp. University of California Press, 1936 ($ 6.50).

The thirty-eight essays comprising this volume were presented to Professor KROEBER in honour of his sixtieth birthday which fell on June 11th 1936. All the contributors to this volume have at some time been associated with Professor KROEBER either as teacher, colleague, or student, and their contributions are unexceptionally excellent. The broad humanistic basis of Professor KROEBER's anthropological studies is well exhibited in CARL L. ALSBERG's *Personal Reminiscences* and in ROBERT H. LOWIE's *Professional Appreciation*. As our greatest authority on the Indians of California (*vide* KROEBER's *Handbook of the Indians of California*, Bureau of American Ethnology, 1925), and as the author of what is in the reviewer's opinion the best general text on Anthropology (*Anthropology*, New York, 1923), in a field in which the texts are many and excellent, as the author of no less than 175 studies in practically every branch of Anthropology, many of which are already classical, as the organizer of the largest and most comprehensive courses in Anthropology given anywhere in the world, Professor KROEBER has made for himself

a place in Anthropology as Professor LOWIE says, not only of honour but of distinction. At sixty Professor KROEBER is still a singularly energetic young man, and it is to be hoped that he may continue to be so for many years to come.

The range of the essays presented to Professor KROEBER are of so wide and so various a nature, and they are all so uniformly excellent that it becomes impossible to do more here, without writing a small book, than to mention them simply by author and title.

S. A. BARRETT, *The Army Worm: A Food of the Pomo Indians.* R. BEALS, *Problems in the Study of Mixe Marriage Customs.* F. BOAS, *The Relations between Physical and Social Anthropology.* FAY-COOPER COLE, *Family, Clan, and Phratry in Central Sumatra.* J. M. COOPER, *Scapulimancy.* J. DOLORES, *Papago Nicknames.* C. DU BOIS, *The Wealth Concept as an Integrative Factor in Tolowa-Tututni Culture.* A. H. GAYTON, *Estudillo Among the Yokuts : 1819.* E. W. GIFFORD, *Californian Balanophagy.* A. A. GOLDENWEISER, *Loose Ends of Theory on the Individual, Pattern, and Involution in Primitive Society.* E. GUNTHER, *A Preiminary Report on the Zoölogical Knowledge of the Makah.* E. S. CRAIGHILL HANDY, *Dreaming in Relation to Spirit Kindred and Sickness in Hawaii.* I. T. KELLY, *Chemehuevi Shamanism.* A. V. KIDDER, *Speculations on New World Prehistory.* E. M. LOEB, *The Distribution and Function of Money in Early Societies.* R. H. LOWIE, *Lewis H. Morgan in Historical Perspective.* J. A. MASON, *The Classification of the Sonoran Languages (with an Appendix by* B. L. WHORF*).* N. C. NELSON, *Notes on the Santa Barbara Culture.* R. L. OLSON, *Some Trading Customs of the Chilkat Tlingit.* L. M. O'NEALE, *Wide-Loom Fabrics of the Early Nazca Period.* E. C. PARSONS, *The House-Clan Complex of the Pueblos.* P. RADIN, *Ojibwa and Ottawa Puberty Dreams.* G. A. REICHARD, *Attitudes Towards Avoidance : A Suggestion.* E. SAPIR, *Hupa Tattooing.* C. SAUER, *American Agricultural Origins : A consideration of Nature and Culture.* W. SCHMIDT, *Donner und Regenbogen beim Höchsten Wesen der Yuki.* H. I. SMITH, *The Man Petroglyph Near Prince Rupert; or, the Man Who Fell From Heaven.* F. G. SPECK, *Inland Eskimo Bands of Labrador.* J. H. STEWARD, *The Economic and Social Basis of Primitive Bands.* M. W. STIRLING, *Florida Cultural Affiliations in Relation to Adjacent Areas.* W. D. STRONG, *Anthropological Theory and Archaeological Fact.* J. R. SWANTON, *Early History of the Eastern Siouan Tribes.* R. C. THURNWALD, *Sozialpsychische Abläufe im Völkerleben.* C. F. VOEGELIN, *Productive Paradigms in Shawnee.* W. LLOYD WARNER, *The Social Configuration of Magical Behavior : A Study of the Nature of Magic.* T. T. WATERMAN, *The Great World Theater. Bibliography of* ALFRED L. KROEBER.

New York University M. F. ASHLEY-MONTAGU

Lucien Lévy-Bruhl. — *Primitives and the supernatural.* Authorized translation by LILIAN A. CLARE. 405 p. New York, E. P. DUTTON & Co., Inc., 1935. Price $ 5.00.

This is a scholarly treatise in a field of anthropology dealing with human activities at the antipodes to those exercised in the pursuit of science. It is a well organized and skillfully related presentation of the primitives' unreal world, which to their untutored minds is capricious, unpredictable, unstable, and terrifying. It deals with the domain of spirits, both good and evil, that may be propitiated by ceremonies and religious rites, or beguiled into forgetfulness by music, palaver, and dancing. The author develops the idea of the dominance of fear of unseen powers among which the primitive person has no concept either of equality or hierarchy. The abstract element common to all these conceptions of primitives is the affective category of the supernatural inducing a certain uniformity of emotion, and being maintained by the continuity of the mysterious happenings in nature interpreted as the intervention of the unseen powers.

The primitive, having no intellectual concept of the law of causation has evolved a fanciful system of amulets, charms, and talismans; and has developed a belief in luck, good and bad; omens; auspicious and inauspicious days and hours; attributions of good luck or the reverse to persons and things; attachment and avoidance with a view to fortune; the interpretation of accidents as portents; presentiments; and in some instances even telepathy.

The primitive expands the experiences of human contacts to the unseen powers and to inanimate objects. He attributes to them dispositions to be feared, propitiated, cajoled, or out-maneuvered. This animism extends to animals, plants, weapons, implements, and the cosmos.

The communal life of the primitive is profoundly influenced and organized by this fear of the unseen. The whole social group combines in ceremonies, dances, masques, songs, rhythm, and music, in collective ecstasies in propitiation of the unseen powers.

The mysteries of sickness and death and the vanishing breath of life remove the living to the unseen world and thus give rise to ancestor worship, and to the demands upon them for rain and other material benefits. These same mysterious misfortunes and all others lead the primitives to seek a source nearer to hand than the unseen powers and to attribute magical powers to members of the immediate society, to the witch, the sorcerer, or the evil eye of man, or even to plants, animals, or inanimate objects. Witchcraft is thus the creation of the affective category of the supernatural.

The fear of the powers of the unseen creates a state of mind which

gives to every phenomenon or act of animal or man contrary to nature an unusual prominance, calling for avoidance, punishment, death, or purification. Into this category fall incest and sexual aberrations. Witchcraft and transgressions especially after sickness and death may induce defilement or obsession and call for purification by ascetic practices. The practical experience of the primitive with contagious diseases tends to extend and reinforce his systems of purifications, isolations, and taboos.

The blood of man to the primitive has magic virtues. Its intimate connection with life and death, the serious consequences of its loss, its relations to homicide, all conspire to actuate fear, to give rise to uncleanness, and even to give to the blood of slaughtered animals comparable powers to that of man. Elaborate taboos, ceremonials, beliefs, and customs have proceeded from the primitive's fear of blood to invest with special significance the menstrual discharges and other matters pertaining to adolescence, pregnancy, abortion, confinement, the placenta, and the umbilical cord.

Purifications among primitives take on a great variety of expression, mostly based on the concept of cleansing by blood and fumigation, and by confession. Extensions of this idea are found in the rites and ceremonies relating to first fruits, in the delays imposed upon the consummation of marriage, in purification by transference, substitution, and the scape-goat. Other methods frequently invoked are those of cancellation by reversal, by counteraction, which must be exactly equivalent and opposite, and by retaliation and compensation.

The treatment of this elaborate analysis of the primitives' concept of the workings of the unseen powers of the supernatural is illustrated throughout by a wealth of illustrative material. A reading of this scholarly treatise throws light on the problems of educators, psychologists, and historians. It reveals an array of obstacles which the dawning scientific approach to nature had to overcome. Perhaps it may throw some light on the mistrust of science which still lingers among men far removed from the primitives, whose bepuzzled minds had more excuse for their fears.

July 23, 1936. CHARLES A. KOFOID

Herbert Spiegelberg.—*Gesetz und Sittengesetz*, p. 380 and two charts. MAX NIEHANS Verlag, Zürich und Leipzig, 1935.

This volume has for its purpose a thoroughgoing critical evalution of scientific legalism (*Legismus*). By legalism, the author means any overemphasis upon the role of law, irrespective of the field in which it occurs, and irrespective of the many different connotations of the

word law. The most striking instance of such legalism, in the author's opinion, is the assumption that laws are the primary, fundamental phenomenon in such subjects as ethics and the natural sciences. SPIEGELBERG's main interest, and most of his time, is devoted to the questions of ethics and legal philosophy. It is apparent that SPIEGELBERG's task is as fascinating as it is difficult. Let it be said at once that he has made a major contribution.

The analysis is divided into a systematic and an historical part. For *Isis* the latter is of more immediate interest, but a brief delineation of the inquiries contained in the former is essential. In the first and second chapters, SPIEGELBERG develops a distinction between the practical and theoretical law (Gesetz) (1), a contrast which is perhaps a little more familiar than he would make the reader believe, at least in English. After all, it goes straight back to ARISTOTLE. SPIEGELBERG himself later cites in his historical survey a good many instances where such a differentiation was drawn, though not fully "spelled out." At any rate, SPIEGELBERG himself traces the necessary distinctions with great lucidity and unfolds their logical implications, for both types of law. First he considers the practical law in four respects. He shows its purely linguistic form, the logical form of the thoughts expressed in such laws, the existential realm of the rules (*Ordnungen*, *Regelungen*) to which such laws apply, and finally the existential realm of the institutions (*Sachgebilde*) with which they deal. He also considers in very general terms the origin of the practical law, finding it to be a command of someone: the giving of laws is the creative act by which these laws are made. After this exposition of the practical law, he turns to the theoretical law which in turn is subjected to a fourfold analysis. Besides the linguistic and the logical form of these laws, SPIEGELBERG studies them in relation to an existential realm of regularities (*Gesetzlichkeiten*) and a related realm of things behaving according to the laws. This

(1) It must parenthetically be remarked that SPIEGELBERG is analyzing law in the sense of *Gesetz* right along, i.e. *lex*, *loi*, and not in the sense of *Recht*, i.e. *jus*, *droit*. He is himself well aware of this difficulty which necessarily obscures a statement of his positions in English. In prefacing his discussion of the problem of law in ethics in English philosophy, he writes (p. 342): "Auf eine Besonderheit muss dabei gleich zu Anfang hingewiesen werden. Die englische Sprache kennt nicht in dem Sinne wie die anderen europäischen Sprachen den Unterschied von *lex* und *jus*, Gesetz und Recht, sondern besitzt für beides den einzigen Ausdruck 'law.' 'Right' hat nie die Bedeutung einer objektiven Ordnung, sondern hauptsächlich adjektivisch die von richtig, und subjectivisch die von Anspruch, Berechtigung. Der Ausdruck 'law' bildet deshalb kein so deutliches Symptom für eine legistische Auffassung wie die Bezeichnungen lex, loi, Gesetz."

analysis is again implemented by a study of the actual origin of this type of law. Perhaps the analysis would have gained greater perspective, if the author had given more space to relating his views to other thinkers, such as J. S. MILL, whose thoughts run along rather similar lines as far as theoretical laws are concerned. As likewise in the preceding analysis of practical laws, the Benthamite-Austinian school would have offered significant comparisons. But of course SPIEGELBERG by focussing attention upon a careful confrontation of the two types is able to show that theoretical and practical laws are not two species of the same genus. He insists that the kinship is stricly verbal. While the reviewer has much sympathy with emphasizing the contrast between theoretical and practical law (2) he fears that SPIEGELBERG has gone too far. The ingenious logical proof for his contention turns upon the meaning which he attaches to the notion of a *Sachverhalt*. Ordinarily, a *Sachverhalt* is the facts of a case. But SPIEGELBERG does not mean that by it ; for he contrasts a *tatsächlicher Sachverhalt* with others. He seems to mean by *Sachverhalt* any reality, whether potential or actual. A practical law, to him, establishes the meaning which a potential body of facts shall have, while a theoretical one asserts that such meaning exists, and then relates such meaning to an existing body of facts. SPIEGELBERG points out that other things than theoretical laws are much nearer to practical laws, for example the order, the decision and other practical forms of thought. Likewise, other forms of thought much more closely resemble theoretical laws than do practical laws, for example judgments, hypotheses, questions and so forth. This is very true, as far as it goes, but it overlooks the crucial feature of all laws, whether theoretical or practical, that they are concerned with recurrent phenomena and that they are looked upon as completely binding for the recurrent facts with which they deal. NEWTON's law of gravitation and a law enacted in parliament are supposed to have this in common : that no exception can be admitted in their determination of the factual states to which they refer. I say : supposed, since it is well-known that natural science has become increasingly doubtful about the possibility of formulating any laws in this strict sense, in other words that it is more correct to treat all " laws " as hypotheses. This new scepticism is paralleled by a decline in the esteem in which laws are held as instruments for the creation and maintenance of social order. Thus considered, the doubts about framing true laws of nature and those about framing right laws of conduct go hand in hand. And it is

(2) See C. J. FRIEDRICH, " Diritto Naturale e Leggi di Natura " in *Rivista Internazionale di Filosofia del Diritto* (1935).

precisely such doubts widespread as they are to-day which give to SPIEGELBERG's volume its timeliness, irrespective of how far one follows him in contrasting theoretical and practical law. This is especially true since a third body of law which SPIEGELBERG takes up in a third part, is even more deeply affected by such uncertainty : the moral law. The author is unquestionably right when he points out that the role to the moral law is rather minor to-day. People do not condemn actions so much because they are in conflict with a law as because " people do not act that way." There are undoubtedly considerable differences between individual human beings in that respect, as there are also between nations. A legalistic outlook is more likely in New England than in Paris, for example. But on the whole, people are more apt to think of virtues than of laws when they consider ethical behaviour. In fact, an extensive literature has grown up on the subject, of which we may here merely mention the works of two leading German philosophers, MAX SCHELER and NICOLAI HARTMANN (3) (to whom curiously enough SPIEGELBERG makes no reference whatsoever). He finds upon close inspection that the moral law is compounded of two elements, moral truth and moral command. Moral truth is essentially couched in terms of a theoretical law, but even the moral command rests upon the moral order to which it refers. As a consequence of these results, the author feels that the moral law should be eliminated from ethics altogether (p. 194), that we find such an ethics without laws already in PLATO and ARISTOTLE (as did HARTMANN), and that we should develop a new ethics in similar terms out of the existing moral order by intuition. Deep sympathy for such views cannot prevent in the reviewer a feeling of apprehension about thus anchoring ethics in intuition. For such intuition must necessarily be inspired by a previously existing moral order, and hence may lead toward an irrational traditionalism. But since SPIEGELBERG does not undertake the task of building up this intuitive ethics, but turns to an historical consideration of the emergence of legalism in ethics and legal philosophy, it seems best to await a further publication, and for the present to consider these historical questions.

Even though SPIEGELBERG looks upon his historical researches only as of secondary importance, as just clearing away the debris for erecting a new ethic without laws, a great deal of interest attaches to them, and in the reviewer's opinion they constitute the most significant part of the volume. For a history of legalism and anti-legalism

(3) MAX SCHELER : *Der Formalismus in der Ethik und die materiale Wertethik*; NICOLAI HARTMANN : *Ethik*.

in ethics and legal philosophy will enable us to see the whole problem more clearly in a perspective. Not the least important part of SPIEGELBERG's contribution is the light it sheds upon obscure phases of the development of natural law. It would, of course, be highly artificial to try to divide all thinkers into legalists and anti-legalists. In order to escape from such formalism, the author suggests certain intermediary positions. Such " partial " legalism may be (1) limited moral positivism such as is found in SUAREZ, PUFENDORF and other natural law thinkers, (2) supplementary imperativism, as illustrated by the Stoa and St. AUGUSTIN, and so on. These are systems where a certain measure of legalism is combined with a recognition of autonomous order. This is a problem which stood in the very center of theological and juristic speculation for centuries. Did God make the laws because they are reasonable and God being a supremely reasonable being could not but make reasonable laws? Or was it reversely God's arbitrary free will which created the laws and the things upon which they operate? St. AUGUSTIN had leaned in the latter direction, though never going as far as WILLIAM OF OCCAM ; St. THOMAS, confronted with the Aristotelian challenge, sought to evolve a formula for escaping this alternative ; GABRIELE VASQUEZ and GROTIUS turn the other way, as epitomized in GROTIUS' famous formula : *est* autem jus naturale adeo immutabile, ut ne a Deo quidem mutari queat..." Here the idea of an independent order is radically asserted. In order to avoid such a conclusion which is at variance with the idea of an all-powerful, personal God, St. THOMAS developed his brilliant doctrine of the law of nature as a " participation of the eternal law in a rational (reasonable) creature." Giving this a psychological turn, THOMAS also speaks of the law of nature as " nothing else than the light of the mind planted in us by God through which we recognize what to do and what to avoid." SPIEGELBERG in setting forth these doctrines (317-8), undertakes to show that back of it all lies the recognition of an autonomous order no more regulated by law. It follows like this : the eternal law is the very " ratio gubernationis rerum." This gubernatio itself is related to a definite purpose, the " bonum essentiale." Thus purpose is itself beyond " law " ; it exists apart from and presumably prior to any eternal law. The difficulty of following this train of reasoning springs from the fact that the rigid distinction between a theoretical and a practical law breaks down, as was shown above, and the eternal law emanating from the will and mind of God is a point of convergence. For if both kinds of law have in common that they refer to recurrent regularities, and that they do so completely or absolutely, then clearly a being unlimited in both power and reason will be a being in whose activity the two actually coincide, no matter

how far apart they may appear to be to beings whose power and capacity to understand (reason) is very limited.

Nevertheless, there can be no question that vital differences result, when either one or the other element is emphasized in the deity. The extreme forms of Calvinism probably represent the furthest limit in asserting the power of God, and deriving therefrom an irrational legalism as it had already appeared in OCCAM. The other trend, the author seems to think, is still in the process of evolution. GROTIUS, MALEBRANCHE, SPINOZA all tend in that direction. The un-legalistic approach of classical Greek philosophy re-emerges. The strands are intertwined in many different ways, of course. There was the Platonic element in St. AUGUSTIN etc. It is obviously impossible to follow the author into all the ramifications of this very complicated network of interrelated ideas. The author deserves compliments for what he has done, but I cannot help feeling a bit of surprise and regret at his indifference toward the large juristic literature on this subject (no mention of GIERKE, even) and his omission of thinkers of such significance as HOOKER, who devoted a whole volume to these problems. There is also the long line of English constitutionalists whose ideas on a fundamental law counterbalance the notion of the philosophers who, as SPIEGELBERG remarks, followed the Occamite tradition (though this cannot be accepted for LOCKE). But apart from such minor blemishes a final query directed toward the very center of the author's analysis must be raised.

The moral law which is the form of legalism peculiar to ethics is even more limited in historical scope than other forms of legalism. In the author's well-supported opinion the moral law arises as a special conception through the confluence of Judaism, Stoicism and Protestantism. Philosophically speaking, it culminates in the doctrine of IMMANUEL KANT through whose influence it spread far and wide in academic circles. The origin of this legalism SPIEGELBERG finds in scholasticism with its doctrine of the *praeceptum morale*; but there is no trace of the *lex moralis*, even in St. THOMAS. It appears in BONAVENTURA, but is thoroughly developed only by MELANCHTHON. After tracing the concept of the moral law in MELANCHTHON and his Lutheran followers, SPIEGELBERG immediately turns to the dissolution of the idea of a God-given law during the eighteenth century and its re-appearance in the Kantian secular garb. Actually, the idea of a moral law became of central importance in Calvinism. CALVIN himself had not developed this notion. But as in so many other things, Calvinism changed. The political views of Calvinism which were to bear such potent fruit in England and America gave a central position to the moral law.

ALTHUSIUS, the greatest and most systematic political thinker of Calvinism, placed the moral law in the very center of law and ethics. He alleged that the law of nature was vulgarly called the moral law. It is implanted in all men. Without it life in society becomes bestial. And what does this law contain? The Decalog, was the answer of ALTHUSIUS. The Occamite tendencies of English thinkers noted above are profoundly related to these Calvinist doctrines. But what is the most remarkable thing, is the tendency to identify these laws of the Decalog with the laws of human nature, that is, to claim that human beings actually tend to behave according to them (4). In other words, once more the absolute contrast between theoretical and practical laws breaks down in the face of a concept of human nature brought into consonance with divine ordination.

May it be permitted to conclude the review of this important book and its challenging thesis by one halting query? If legalism in ethics and legal philosophy was historically associated with the rise of late scholasticism (the conciliar movement), of Calvinism and of Kantianism, each of which in turn was a significant contributor toward the ethic of popular government, had not those of us who are attached to democracy and freedom better seek to buttress its deeper foundations? Might not all that has been said suggest that ethics without law, without explicit norms, an ethics and a law in terms of an autonomous order is a weapon in the armory of fascism? Echoes of the new German Criminal Code seem to resound in such ideas. For according to this code the Courts shall punish offenses not punishable under the Code when they are deserving of punishment " according to the underlying idea of a penal code or according to healthy public sentiment." (5) The idea of an ethics without laws has great appeal to the modern mind; yet " by their fruits ye shall know them." CARL JOACHIM FRIEDRICH.

Arthur O. Lovejoy.—*The Great Chain of Being.* ix + 382 p. Harvard University Press, Cambridge, Mass., 1936. (Price $ 4.00).

This new book by Professor LOVEJOY may perhaps be characterized by the observation that it belongs to the genus of philosophy, to the species of metaphysics, and to the variety of ontology. Its subtitle is " A Study of the History of an Idea " and it contains the lectures delivered by the author in the second half of the academic year 1932-33 under the William James foundation of Harvard University.

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(4) See C. J. FRIEDRICH, Introduction to *Johannes Althusius' Politica Methodice Digesta* (1932), particularly pp. XCIV ff.

(5) Compare C. H. MCILWAIN's striking article "Government by Law " in *Foreign Affairs*, XIV, 185 ff.

In the preface the author defines his domain by stating " that the use of the term ' the chain of being ' as the descriptive name for the universe was usually a way of predicating of the constitution of the world three specific, pregnant, and very curious characteristics; that these characteristics implied a certain conception of the nature of God; that this conception was for centuries conjoined with another to which it was in latent opposition..." The book is divided into eleven lectures with titles as follows: (1) Introduction: the study of the history of ideas; (2) the genesis of the idea in Greek philosophy: the three principles; (3) the chain of being and some internal conflicts in medieval thought; (4) the principle of plenitude and the new cosmography; (5) plenitude and sufficient reason in LEIBNIZ and SPINOZA; (6) the chain of being in eighteenth-century thought, and man's place and rôle in nature; (7) the principle of plenitude and eighteenth-century optimism; (8) the chain of being and some aspects of eighteenth-century biology; (9) the temporalizing of the chain of being; (10) romanticism and the principle of plenitude; (11) the outcome of the history and its moral. The text of the lectures is illuminated by 36 pages of notes.

The book which we have undertaken to review is a difficult one to appraise fairly since one's approach to the fundamental problem and his reactions to the development of its solution possess in the present instance a strong subjective bias. If one has been trained in Platonic idealism, appreciates its development under the neo-platonists, and feels sympathy with the present idealistic philosophy as it derives its sustenance from Plato's doctrine of ideas, then the volume before us will be a thoroughly welcome one. It is safe to say that this position is probably the dominating one among professional philosophers of the present time. But if one follows more closely the threads of the philosophy of science, has pursued the philosophical trends of mathematics, has examined the epistemology of the theory of probability, and above all has explored the baffling metaphysics of modern physical discovery, he will find the present volume quite unsatisfactory in many places. The task of the reviewer is thus seen to depend in some part upon his personal bias toward one or the other of these two positions.

Let us examine the contents of the book. The problem which the author studies is the problem of *being*, a word which is difficult to define at best. Used in a Hegelian sense it refers to something more tenuous than existence; in another sense it refers to something that may be logically conceived, and in a third sense as something which exists in space or time, or in ideas or the world of matter. Professor LOVEJOY is quite evasive as to which of these senses he employs.

There is in fact a decided mingling of these various concepts, and a precise definition of the word is not given.

The thread of the book is woven around three concepts, the " three specific, pregnant, and very curious characteristics " which the author mentioned in his preface. These concepts are called by the author the principles of continuity, plenitude, and gradation. As in the case of being, no exact definition of these terms is given, except in the case of continuity where ARISTOTLE's naïve assertion is quoted that " things are said to be continuous whenever there is one and the same limit of both wherein they overlap and which they possess in common." It may be forgiven the author that as a philosopher he might choose to omit reference to the immense amount of work that has been done by mathematicians on this fruitful subject since the days of WEIERSTRASS, but one must regard it as strange that he should not mention the brilliant contributions of ZENO OF ELEA to the understanding of the matter. The principle of plenitude appears to affirm that " no genuine potentiality of being can remain unfulfilled " and the principle of gradation that all things can be graded " according to their degree of ' perfection ' "

In the first chapter the author considers the study of the history of ideas. This history must take cognizance of several phases. Among these one finds the " more or less unconscious mental habits, operating in the thought of an individual or a generation " and again " dielectical motives " as exemplified by nominalistic and organismic concepts. A third type the author characterizes as " metaphysical pathos," which arouses " voluminous emotional reverberations... in the reader without the intervention of any definite imagery," and a fourth type is associated with " philosophical semantics—a study of the sacred words and phrases of a period or a movement." The author epitomizes his objectives as follows : " It is the eventual task of the history of ideas to apply its own distinctive analytical method in the attempt to understand how *new* beliefs and intellectual fashions are introduced and diffused, to help to elucidate the psychological character of the processes by which changes in the vogue and influence of ideas came about ; to make clear, if possible, how conceptions dominant, or extensively prevalent, in one generation lose their hold upon men's minds and give place to others."

The history of ideas begins naturally with its genesis in Greek philosophy. The influence of PLATO is assumed to be the dominating one and the author makes a dichotomy between those concepts which may be characterized as " otherworldly " and " thisworldly." The principles of continuity, plenitude, and gradation run as red threads through the book and serve to tie the general developments together.

More references to them are drawn from poetry than from science, an observation which tends to characterize the book as a whole.

The postulate of sufficient reason is appealed to in many parts of the book, although its principal interpretation is taken from the works of LEIBNIZ. Unfortunately the remarkable development of this concept by writers on the theory of probability has been entirely omitted. The principle of sufficient reason has probably been subjected to a more careful scrutiny by these philosophers than by any other group. Hence the omission of reference to modern work on this subject is very much to be regretted.

In the last lecture of the book the author summarizes and draws his conclusions. Thus the author says : " By this sort of faith in the rationality of the world we live in, a great part... of Western philosophy and science was, for a score of centuries, animated and guided, though the implications of such a faith were seldom fully apprehended and came only slowly to general recognition." He reaches the melancholy conclusion that " the history of the idea of the Chain of Being—in so far as that idea presupposed such a complete rational intelligibility of the world—is a history of failure." The book concludes with the following wise observation : " The utility of a belief and its validity are independent variables ; and erroneous hypotheses are often avenues to truth."

The deep scholarship of Professor LOVEJOY in classical and medieval literature is apparent throughout the work. The book is beautifully issued and reaches the customary high standards of the Harvard University Press.

(*Indiana University*). H. T. DAVIS.

Nathan A. Smyth. — *Through Science to God.* vii + 213 pp. New York : The MACMILLAN Company, 1936 ($ 2.50).

In this book the author sets out to ask and to provide an answer to the question : What is the meaning of this cosmos and man's place in it? He realizes that it is important at the outset that the question be asked in the proper terms, and Mr. SMYTH therefore proceeds in the first part of his book to define his terms and to provide us with a working system of co-ordinates which are for the most part based on the findings of the modern physicists, chiefly as portrayed in the writings of EDDINGTON and JEANS. This task Mr. SMYTH performs with admirable ease and clarity. The main point emphasized is that all experience, all that we know or can know directly is comprised of the events that occur in our consciousness, that these are our sole data out of which we fabricate what we are able. This is our only reality, and this is our world. Behind the events which pass before the screen of our consciousness, our

realities, lie the corresponding *actualities*, which we may know only as, through perception, we realize them subjectively. What these extra-conscious actualities are we cannot know, all that we can know are the relations in which they express themselves. This viewpoint is termed *Actualism*.

"The success of scientific actualism is due in no small part to its refusal to be drawn into many lines of inquiry which the excursions of methaphysics have proved to be but blind alleys, and to its devotion to its own path of progress. If the scientist should sit down to speculate upon the nature of actual events, or to question how it has come to pass that actual events occur at all or why real ones correspond with them or what has brought it about that both actual and real events tend persistently to occur under the same uniform relationships and cyclical sequences, he would soon find that he had been idling away his time in wholly futile endeavors. Instead, the achieving scientist looks upon such questions as unanswerable. They belong to the great ultimate mystery that science now recognizes. No answer can be given to the ultimate question Why? All that is given man to know is *how* events occur; — in what relationships and under what routine sequences. The order of the universe man may learn". (29)

After making clear the pictorial nature of our knowledge Mr. SMYTH gives an account of some of the new pictures of the nature of space and time, mind, force, truth, and creation. He quickly disposes of the theological notion of a Creator and of Creation, — creation for him is but another word for evolution or creative evolution, but not evolution through the agency of any man-made or man-like creator.

"We can, it would seem, come to a better understanding of our universe by ceasing to attribute it to a man-like Creator and studying the nature and trends of the creative changes that come to pass in the course of events. There is of course no objection to calling God the Creator as a matter of verbal convenience; but little or nothing of knowledge is to be gained thereby." (62).

In a chapter entitled *Charting the Cosmic Stream* Mr. SMYTH endeavours to maintain the thesis that the trend of the universe "which chiefly concerns us as human beings can adequately be portrayed as that of design, design to produce and develop life." From the earliest beginnings of the cosmos, so far as we have come to understand them, there is evident, according to Mr. SMYTH, a progression of events which conforms to the image of design, design to produce and develop life. Mr. SMYTH claims no more than the value of a working hypothesis for this concept. He agrees that things happen not because they must but because they do, but he feels the necessity of an interpretative principle. He writes,

"If we so limit our definition of design as to cover a trend towards a discernible goal marked by a step by step progress and the adaptation of means to an end,

and omit from it the elements of all-wise planning and an omnipotent will, it may be found that design succeeds as an interpretative principle where determinism fails." (90-91).

The working out of the cosmic design in which man as an integral part of it participates is the answer which Mr. SMYTH returns to the question originally posed. The development of this answer in his succeeding chapters on God, Man and God, Man's Creative Part, and The Worth of Life, constitutes the most excellent part of this very excellent book. One may not always agree with Mr. SMYTH, but one cannot help, indeed, one is compelled to admire the ability with which he carries out his high and noble purpose. This is a beautiful book, and all the world should read it.

New York University M. F. ASHLEY-MONTAGU

Forty-ninth Critical Bibliography

of the

History and Philosophy of Science and of the History of Civilization

(to end of December 1936 *— with special reference to sections* 15 *to* 19*)*

This forty-ninth Bibliography contains about 525 items of which 95 deal with Science in general and Logic. They have been kindly contributed by the eight following scholars belonging to four different countries:

C. W. ADAMS (Hertford, England)
M. F. ASHLEY-MONTAGU (New-York City)
C. D. LEAKE (San Francisco, Cal.)
J. PELSENEER (Brussels)
A. POGO (Washington, D. C.)
S. SAKANISHI (Washington, D. C.)
G. SARTON (Cambridge, Mass.)
M. C. WELBORN (Cambridge, Mass.)

This Bibliography includes as usual a series of addenda and errata to SARTON's *Introduction to the History of Science*, vols. 1 and 2 (Baltimore and London, 1927 and 1931). Its purpose and methods have been explained in the preface to the 38th Critical Bibliography (*Isis* 20, 506-08).

The sections 15 to 19 are especially full, as I have liquidated as much as I could of my stock of notes concerning them.

I have in my drawers a large number of notes which I will be glad to publish as soon as I have been able to check them upon the originals.

I entreat the authors of relevant books and papers to send me copies of them *as promptly as possible* in order that their studies may be registered in this bibliography and eventually reviewed and discussed. By so doing they will not simply help me and every other historian of science but they will help themselves in the best manner for they will obtain for their work the most valuable publicity and its certain incorporation into the literature of the subject.

Many of the notes were checked and the final manuscript and proofs of this Critical Bibliography were kindly read by Dr. M. C. WELBORN.

Harvard Library, 185
Cambridge, Mass.

GEORGE SARTON.
January 21, 1937.

PART I

FUNDAMENTAL CLASSIFICATION (CENTURIAL)

Vth Century B.C.

Brunn, W. v. Neues und Altes von der Heimatinsel des HIPPOKRATES (Kos). *Deutsche medizinische Wochenschrift* No. 10, 394, 1935. ISIS

Diller, Hans. Eine stoisch-pneumatische Schrift im Corpus Hippocraticum. *Sudhoffs Archiv für Geschichte der Medizin* 29, 178-95, 1936. ISIS

Apropos of the *Περὶ τροφῆς*. G. S.

Lennep, D. F. W. van EURIPIDES : *Ποιητὴς σοφός*. Amsterdam, SWETS and ZEITLINGER, 1935. ISIS

Schlichting, Th. H. De grondgedachten van HIPPOCRATES. *Bijdragen tot de geschiedenis der geneeskunde* 16, 133-40, 1936. ISIS

IVth century B.C. (whole and first half)

Luria, S. Die Stellung PLATONS und ARISTOTELES zu den exakten Wissenschaften. *Archives for the history of science* 9, 303-13, 1936 (in Russian with German summary). ISIS

IInd century B.C. (second half)

Davis, Tenney L. The dualistic cosmogony of HUAI-NAN-TZŬ and its relations to the background of Chinese and of European alchemy. *Isis* 25, 327-40, 1936. ISIS

Ist century B.C. (whole and first half)

Hulme, E.W. Gallic fortification in CAESAR's time. *Transactions of the Newcomen society* 15, 63-5, 1 fig., 1934-35. ISIS

Ist century (second half)

Solomiac, Michel. Les tours royales de JOSÈPHE FLAVIUS. 93 p. illus. Jérusalem, DIVAN, 1936. ISIS

"Il y a environ une cinquantaine d'hypothèses connues qui se rapportent au trajet des trois murailles de l'Antique Jérusalem, et ce grand nombre d'hypothèses prouve par lui-même que la topographie de la Jérusalem, d'autrefois n'a pu encore être fidèlement restaurée, dans sa réelle authenticité ... La seule hypothèse vraie ne pourrait être que celle qui s'accorderait absolument en tous points avec la description de Jérusalem donnée par JOSÈPHE FLAVIUS, ou, au moins, celle qui réduirait ses contradictions au minimum."

IInd century (second half)

Didsbury, Georges. Considérations sur la migraine d'après ARÉTÉE DE CAPPADOCE. *Bull. de la soc. franç. d'hist. de la méd.* 34, 260-67, 1936. ISIS

Gerlach, Wolfgang. Meer und Schiffahrt in Bildern und Sprache GALENS. *Sudhoffs Archiv für Geschichte der Medizin* 29, 328-33, 1936. ISIS

IIIrd century (whole and first half)

Orlinsky, Harry M. The columnar order of the Hexapla. *Jewish quarterly review* 27, 137-49, 1936.

"Behind the formation of the Hexapla, and certainly the only reason for the order in which the six columns were drawn up, was the desire of ORIGEN to provide his fellow Christians with a text-book wherewith to learn the Hebrew language."

Scott, Walter (1855-1925). Hermetica. The ancient Greek and Latin writings which contain religious or philosophic teachings ascribed to HERMES TRISMEGISTUS. Edited with English translation and notes. Vol. III : Commentary : Latin ASCLEPIUS and STOBAEI Hermetica. Volume IV : Testimonia, with introduction, addenda and indices by A. S. FERGUSON. 632 p.; xlix-576 p. Oxford, Clarendon Press, 1926; 1936. (25 s. and 30 s., set price for the 4 vols. 84 s.). ISIS

A long review was devoted in *Isis* 8, 343-6 to the first two volumes of SCOTT'S *magnum opus*. The third volume including notes on the Latin ASCLEPIUS and the Hermetic excerpts of STOBAEUS was edited by Prof. A. S. FERGUSON of Aberdeen, who received assistance from F. LL. GRIFFITH for Egyptian antiquities. That third volume appeared not long after SCOTT'S death and was largely his own work. The fourth volume, including Testimonia of ancient and mediaeval authors was substantially written by WALTER SCOTT (to p. 352), but the editor has added a preface of 40 p., elaborate addenda (p. 353-500) and indices (501-75). My only regret is that the Arabic

testimonia have not been investigated as thoroughly as the Greek or the Latin ones. The author should have obtained the collaboration of an Orientalist. G. S.

IIIrd century (second half)

Birkenmajer, Alexandre. DIOPHANTE et EUCLIDE. *Mathematica* 9, 310-20, 1935. ISIS

"Si l'on compare l'*Arithmétique* de DIOPHANTE aux *Éléments* d'EUCLIDE, il n'est pas difficile d'apercevoir qu'il existe, entre ces deux œuvres, plusieurs points de ressemblance. Il serait trop long d'en vouloir dresser ici le catalogue complet. Ce n'est pas d'ailleurs le but de la présente communication. Mon vrai dessein est d'exposer aujourd'hui une idée qui me paraît nouvelle et qu'on peut exprimer dans les termes suivants : La comparaison entre les deux œuvres est en état de jeter un peu de lumière sur la question tant disputée : DIOPHANTE a t-il résolu ses problèmes indéterminés par une analyse plus ou moins méthodique ou bien par un simple tâtonnement?"

Vth century (second half)

Coomaraswamy, Ananda K. The source of, and a parallel to, DIONYSIUS on the beautiful. *Journal of the greater India society* 3, 36-42 (no date). ISIS

VIIth century (whole and first half)

Fonahn, A. Notes on the Tanjur in Oslo. *Oslo etnografiske museum, skrifter* 3, viii+40 p., Oslo, BRØGGER, 1936. ISIS

Includes a list of the titles and authors of the first thirty-one volumes of the Mdo-section and notes on Hînayâna and Mahâyâna. G. S.

VIIIth century (whole and first half)

Lippmann, Edmund O. von. Das älteste noch vorhandene Muster von Rohrzucker. *Die Deutsche Zuckerindustrie* N^{r} 25, p. 621, Berlin, 1936. ISIS

IXth century (second half)

Garbers, Karl. Ein Werk THĀBIT B. QURRA's über ebene Sonnenuhren. Herausgegeben, übersetzt und erläutert. 79 p., 25 fig. *(Quellen und Studien zur Geschichte der Mathematik, Astronomie und Physik,* Abteilung A : Quellen, 4. Bd.) Berlin, SPRINGER, 1936. (RM 19.80). ISIS

Edition of this astronomical treatise upon the ms. found in the Köprülü library of Istanbul by H. RITTER Says the editor : " Die Sonnenuhr... in deren astronomische und mathematische Problemstellung uns, was den mittelalterlichen Orient betrifft, besonders eingehend die Arbeiten von C. SCHOY einführen, hat den grossen Mathematiker der Araber, THĀBIT B. QURRA, mehr beschäftigt, als man bisher annahm. Als der PTOLEMÄUS der Araber wird gewöhnlich AL-BATTĀNĪ bezeichnet. Dieser gibt in seinem astronomischen Hauptwerk auch die Konstruktion einer *basīṭa*, einer ebenen horizontalen Sonnenuhr, an. Die Geschichte der arabischen Gnomonik hatte nach SCHOY lange in BATTĀNĪ's Ausführungen das älteste Material für die Theorie und Berechnung von Sonnenuhren bei den Arabern zur Verfügung. Von dem älteren THĀBIT erschien dann in der Übersetzung von E. WIEDEMANN und J. FRANK 1922 (*Isis* 5, 209) ein Traktat " Über die Konstruktion der Schattenlinien auf horizontalen Sonnenuhren. " Hierneben stellen wir nun eine erschöpfende Behandlung der ganzen Fragestellung für die ebenen Sonnenuhren zu jener Zeit, die sogenannten *rukhāmāt*, durch diesen bedeutenden mathematischen Kopf, welche weit über das hinausgeht, was uns AL-BATTĀNĪ bietet, und die in gleich unfassender Weise erst von ABŪ-'L-ḤASAN 'ALĪ AL-MARRĀKUSHĪ wieder unternommen wird, wie aus den Schriften SCHOY's zu ersehen ist. THĀBIT beschäftigt sich nicht allein mit der horizontalen, sondern kommt über diese und fünf weitere Arten, zwei in die Kardinalrichtungen fallende und eine von diesen abweichende Vertikaluhr, ferner zwei gegen den Horizont geneigte, einerseits auf dem Meridian, andrerseits auf dem ersten Vertikal senkrecht stehende Uhren, zu dem allgemeinsten Fall einer beliebig geneigten Uhr. Er stimmt in dieser Disposition mit dem späteren ABŪ-L-ḤASAN 'ALĪ von Marokko völlig überein. Der Gang der Entwicklung ist in dem vorliegenden Traktat genau, wie es WIEDEMANN und FRANK für die 'Konstruction der Schattenlinien' feststellen, der des Aufstiegs vom Besonderen zum Allgemeinen. Es wird uns in dem allgemeinsten Fall aber nicht die Möglichkeit einer Deduktion der besprochenen Sonderfälle aus diesem allgemeinsten geboten. Dazu war die mathematische Formelsprache der Zeit nicht hinreichend ausgebildet." The book is divided as follows : introduction (p. 1-13); Arabic text (p. 14-37); brief glossary (p. 37-38); German translation (p. 39-77); bibliography (p. 78-79); index (p. 80). G. S.

Rāzī. Bur' al-sā'ah. Cairo, 1936. ISIS

Correction to the note in *Isis* 25, 528, kindly communicated by Dr. E. WICKERSHEIMER. The Dr. KĪK is Dr. PIERRE GUIGUES, Professor at the medical faculty of Beirūt, who edited the Arabic text (22+13 p., Beyrouth, Paris 1904) and published a French translation with notes " La guérison en une heure de RAZÈS" in *Janus* (vol. 8, 363-70, 411-18, 1903). I had been misled because the Arabic Cairene editor spelled Dr. GUIGUES' name with two kāf. G. S.

Schleifer, J. Zu SOBHYS general glossary der Dahira. *OLZ* 39, 665-74, 1936. ISIS

Lexicographical remarks on the *Kitāb al-dhakhirat fī 'ilm al-ṭibb* of THĀBIT IBN QURRA, edited by G. SOBHY (Cairo 1928; *Isis* 13, 364-65). G. S.

Xth century (whole and first half)

Bergdolt, Ernst. Beiträge zur Geschichte der Botanik im Orient. I. IBN WAHHSCHIJA : Die Kultur des Veilchens (Viola odorata L.) und die Bedingungen des Blühens in der Ruhezeit; II. Über einige Pfropfungen; III. Wasseranzeigende Pflanzen. Sonderabdrucke aus den *Berichten der Deutschen Botanischen Gesellschaft* 50, 321-36, 1932; 52, 87-94, 1 pl., 1934; 54, 127-34, 2 pl., 1936. ISIS

Xth century (second half)

Ali Cohen, M.L.A.S. Iets over ABU L KASEM en behandeling van varices. *Bijdragen tot de geschiedenis der geneeskunde* 16, 142-49, 1936. ISIS

Treatment of varices by ABŪ-L-QĀSIM. G. S.

Darlington, Oscar G. GERBERT, " Obscuro loco natus". *Speculum* 11, 509-20, 1936. ISIS

XIth century (whole and first half)

Birkenmajer, Alexander. AVICENNAS Vorrede zum " Liber sufficientiae " und ROGER BACON. *Revue néoscolastique de philosophie* 36, 308-20, 1936. ISIS

Firdawsi, 934-1934. Edition de l'Académie des sciences de l'U.R.S.S. 217 p. Leningrad, 1934 (in Russian). ISIS

Reviewed by B. NIKITINE, *Journal asiatique* 228, 161-64, janvier-mars, 1936 (received oct. 1936).

XIth century (second half)

Ellinwood, Leonard. Musica HERMANNI CONTRACTI. 71 p. University of Rochester, Eastman School of Music, 1936. ISIS

Sakanishi, Shio. An essay on landscape painting, by KUO HSI. Translated from the Chinese. A foreword by L. CRAMMER-BYNG. 64 p. London, MURRAY, 1935. ISIS

Reviewed by GEORGE SARTON, *Isis* 25, 461-64, 1 pl., 1936.

XIIth century (whole and first half)

Müller, Martin. Die Quaestiones naturales des ADELARDUS VON BATH,

hrsg. und untersucht. viii + 92 p. (*Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters*, 31). Münster i.W., 1934. ISIS

Reviewed by LYNN THORNDIKE, *Isis* 25, 464-65, 1936

XIIth century (second half)

Birkenmajer, Alexander. Eine wiedergefundene Übersetzung GERHARDS VON CREMONA. Geisteswelt des Mittelalters, Studien und Texte, MARTIN GRABMANN zur Vollendung des 60. Lebensjahres von Freunden und Schülern gewidmet, 472-81, (no date). ISIS

Edition of the *Distinctio Alfarabii super librum Aristotelis de naturali auditu*, on the basis of a thirteenth century MS. found at the University Library of Graz. G. S.

Deztany, Lluis. ALCOATÍ. Libre de la figura del uyl. Text català traduït de l'Àrab per mestre JOAN JACME i conservat en un manuscrit del XIV^n^ segle à la Biblioteca capitular de la Seu de Saragossa, ara exhumat i presentat. Amb una notícia històrico-medical del JOSEP M. SIMON DE GUILLEUMA. 245 p. Barcelona, 1933. ISIS

First edition of the Catalan translation of the *Congregatio sive Liber de oculis* of SALOME son of ARIT ALCOATIM (see my *Introd.*, 2, 430). The Catalan translator is the Montpellier professor JOANNES JACOBI (JOAN JACME) author of one of the most popular plague treatises of the Middle Ages. It may now be considered proved that JOANNES JACOBI was a Catalan. The edition of his Catalan translation of ALCOATIM has been done not only with great care, but with (in my opinion) excessive meticulosity. The text is reproduced column by column and line by line. An elaborate historical introduction dealing with Catalan ophthalmology to the end of the fourteenth century and with JOAN JACME has been provided by Dr. JOSEF M. SIMON DE GUILLEUMA, as well as a glossary (ancient Catalan, modern Catalan). Following the Catalan translation of ALCOATIM is another Catalan ophtalmological treatise presumably by the same author, *Letres que Galien trames a Coris el maestre de les malalties dels uyls e de les cures* (from the same MS., fol. 90 to 98 but one folio is unfortunately missing). I may recall that that second Catalan text was recently translated into Latin by the late PIERRE PANSIER (Paris 1933; *Isis* 24, 212).

The Latin ophthalmological treatise also ascribed to the same JOANNES JACOBI and found in the same Zaragoza MS., is edited at the end of this volume, but with less meticulosity than the Catalan texts (p. 237-245). This handsome volume, printed on April 14, 1933 " second anniversary of the proclamation of the Catalan republic " bears no publishers' name. It is published by a wealthy chemical and pharmaceutical firm " Los laboratorios del Norte de España " located in Masnou, Barcelona, and directed by J. CUSI (not LUSI). The same firm published the *Al-murshid fī-l-kuhl* of AL-GHĀFIQĪ edited by M. MEYERHOF (1933; *Isis* 22, 539-542) and various other books reviewed in *Archeion* (vol. 16, 459-61). G. S.

Hadas, Moses. JOSEPH ZABARA and DIOGENES LAERTIUS. *Jewish quarterly review* 27, 151-54, 1936. ISIS

XIIIth century (whole and first half)

Corner, George W. A thirteenth century medical cryptogram. *Bulletin of the institute of the history of medicine* 4, 1 illus., 745-750, 1936. ISIS

"In the library of Dr. HARVEY CUSHING at New Haven, Connecticut, there is a twelfth century manuscript containing the surgery of Master ROGER and the so-called Bamberg surgery. As is often the case with medieval manuscripts, various owners have almost filled the margins and other unused space with memoranda, prescriptions and notes. Among these marginal additions are three written in a thirteenth century handwriting, which contain words in peculiar characters resembling, at first sight, the Greek alphabet."

"The thirteenth century physician or student who wrote these three prescriptions upon the CUSHING manuscript seems to have employed secret writing because each of them deals with a matter subject, for one reason or another, to concealment from lay readers, namely the induction of menstruation, preparation of the anesthetic sponge, and the making of a dangerous inflammable munition of war."

Frers, Erich. Die "Practica" aus dem Micrologus RICHARDS DES ENGLANDERS. II. Institut für Geschichte der Medizin der Universität Leipzig, 55 p., 1934. ISIS

Ginsburg, Benjamin. DUHEM and JORDANUS NEMORARIUS. *Isis* 25, 341-62, 4 fig., 1936. ISIS

"The episode of JORDANUS, so far from proving mediaeval participation in modern science, as DUHEM claims, proves in reality just the opposite thesis."

Hellriegel, Herbert. Die "Practica" aus dem Micrologus RICHARDS DES ENGLÄNDERS. I. Institut für Geschichte der Medizin der Universität Leipzig 64 p., 1934. ISIS

Sarton, George. Query no. 64. IBN SHABBATH, a thirteenth century engineer? *Isis* 25, 455, 1936. ISIS

XIIIth century (second half)

Birkenmajer, Aleksander. WITELO Najdawniejszy Śląski Uczony. 32 p. Wydawnictwa Instytutu Śląskiego, Katowice 1936 ISIS

Davidson, Israel. LEVI BEN ABRAHAM BEN HAYYIM, a mathematician of the XIIIth century. *Scripta mathematica* 4, 57-65, 1936. ISIS

Including the Hebrew text of chapter 7 (mathematics) of the *Botte hanefesh*, a rimed compendium of various sciences. (to be continued).

Garosi, A. Spunti di organizzazione sanitaria di guerra in documenti senesi del dugento. *Rivista di storia delle scienze mediche e naturali* 27, 233-42, 1936. ISIS

Haddad, Sami I. Who was the discoverer of the pulmonary circulation of the blood? 9 p. in Arabic with 1 pl. (facsimile). Reprinted from the review *Muqtaṭaf* for October 1936. ISIS

Apropos of IBN AL-NAFIS, q.v., *Introduction* vol. 2, p. 1100, and *Isis*, vol. vol. 23, 100-120. G. S.

Magnaghi, Alberto. Precursori di COLOMBO? Il tentativo di viaggio transoceanico dei genovesi fratelli VIVALDI nel 1291. 156 p. (*Memorie della Reale Società Geografica italiana*, 18). Rome, Arti Grafiche, 1935. ISIS

Reviewed by G. R. CRONE, *Geographical journal* 88, 184-85, 1936. Argues that the voyage came to an end on the North African coast, and that its object was to reach India by sailing westwards. C. W. A.

Ross, Sir E. Denison. MARCO POLO and his book. (Annual Italian lecture). *Proceedings of the British Academy*, 20, 181-205, 1934. ISIS

Ruska, Julius. Studien zu den chemisch-technischen Rezeptsammlungen des *Liber Sacerdotum*. *Quellen und Studien zur Geschichte der Naturwisschaften und der Medizin*, 5, 83-125, 1936. ISIS

" Die Untersuchung der Rezepte hat gezeigt, dass neben geschlossenen Gruppen noch zahlreiche Einzelvorschriften zum Bestand des *Liber Sacerdotum* gehören, deren Herkunft vorläufig nicht ermittelt werden kann. Die grosse Zahl der aus dem Arabischen übersetzten oder zweifellos unter dem Einfluss arabischer Vorlagen entstandenen Rezepte lässt den Schluss zu, dass ihre Zusammenfassung ungefähr gegen Ende des 13. Jahrhunderts stattgefunden hat. Die Tatsache, dass der Sammler auch alte lateinische Stücke aus der *Mappae Clavicula* und verwandten Sammlungen aufgenommen hat, ändert nichts an dieser grundsätzlichen Feststellung. Dass die Entlehnungen so ganz planlos und ohne jede Ordnung zwischen den übrigen Rezepten auftauchen, verstärkt nur den Eindruck, dass die Sammlung wesentlich auf arabischer Überlieferung beruht. Der technische Wert der Rezepte ist begreiflicherweise ein sehr verschiedener. Neben kurzen, nüchtern handwerksmässigen Rezepten stehen reine Schreibtischprodukte,

neben Vorschriften zur Herstellung von Legierungen oder Farben alchemistische Rezepte, denen wir heute jeden Wert absprechen müssen. Dem Sammler sind aber die eindeutig alchemistischen Rezepte, die er in geschlossener Reihe an die Spitze gestellt hat, offenbar der wichtigste Teil seines Werks gewesen. Das führt uns noch einmal zu der Frage zurück, welchen Sinn der Titel *Liber Sacerdotum* nun eigentlich haben kann. Wir haben gesehen, dass von Priestern oder irgendeiner Beziehung zu kultischen Dingen in der ganzen Sammlung keine Spur zu finden ist. Wenn nun das Werk Rāzīs in der lateinischen Literatur den Titel *Liber Secretorum* führt — wäre es da eine zu kühne Konstruktion, wenn ich annehme, dass auch unsere Sammlung ursprünglich diesen Titel geführt hat? Wer mit den in den Handschriften üblichen Kürzungen Bescheid weiss, wird es durchaus für möglich halten, dass ein späterer ungeschickter Abschreiber ein abgekürztes *Liber Secretorum* als *Liber Sacerdotum* gelesen hat."

Solalinde, A.G. Fuentes de la " General estoria " de ALFONSO EL SABIO, III. *Revista de filología española* 23, 113-142, 1936. ISIS

XIVth century (whole and first half)

Birch, T. Bruce. The theory of continuity of WILLIAM OF OCKHAM. *Philosophy of science* 3, 494-505, 1936. ISIS

Boffito, Giuseppe. Della " matematica " nell'uso popolare dotto e lessicale al tempo e nell'opera di DANTE. *Pubblicazioni del Collegio alla Querce di Firenze* 36, 23 p. 1937. ISIS

Crescenzi, Pier de' (1233-1321). Studi e documenti a cura di TOMMASO ALFONSI; ROBERTO BOZZELLI; LODOVICO FRATI; ALESSANDRO GHIGI; GIOVANNI LIVI; ARTURO PALMIERI; NAPOLEONE PASSERINI; LINO SIGHINOLFI; ALBANO SORBELLI; FRANCESCO TODARO; GASPARE UNGARELLI; DINO ZUCCHINI; GUIDO ZUCCHINI. (Società agraria di Bologna). xxvii+377 p., 25 pl. Bologna, CAPPELLI, 1933 (Lire 50). ISIS

Elaborate preface by DINO ZUCCHINI. Then series of six studies on CRESCENZI's life and times, five studies on the *Ruralium commodorum libri XII* and very elaborate bibliographies of MSS and editions (p. 259-369).
G. S.

Eckhart, Meister. Die deutschen und lateinischen Werke. Hrsg. im Auftrage der Deutschen Forschungsgemeinschaft. Die lateinischen Werke, III. Bd. : Expositio sancti evangelii secundum JOHANNEM. I. Lfg. Die Deutschen Werke, I. Bd. : Meister ECKHARTS Predigten. 1. Lfg. xxxi+93 p.; 95 p. Stuttgart, KOHLHAMMER, 1936. ISIS

Reviewed by MARTIN GRABMANN, *DLZ* 57, 1511-21, 1936.

Ritter, Hellmut. Kitāb-al-wāfī bi'l-wafayāt. Das Biographische Lexikon des ṢALĀḤUDDĪN HALĪL IBN AIBAK AṢ-ṢAFADĪ. Teil I. 385 p. (*Bibliotheca islamica*, 6a). Leipzig, BROCKHAUS, 1932. ISIS

Reviewed in *Jewish quarterly review* 27, 195, 1936.

Sarton, George. Query no. 63. Early editions of the *Deutsche Sphaera* of CONRAD OF MEGENBERG. *Isis* 25, 455, 1936. ISIS

Somogyi, Joseph de. ADH-DHAHABĪ's "*Ta'rīkh al-islām*" as an authority on the Mongol invasion of the Caliphate. *Journal of the royal asiatic society* 595-604, 1936. ISIS

"There is one work containing a rather detailed record of the principal events of the Mongol invasion, and this is the hitherto unedited *Ta'rīkh al-islām* of ADH-DHAHABĪ (673/1274 to 748/1348). He needs no introduction to Arabic scholars, so well-known and much used are his works on ḥadīth and his historical compendium *Kitāb duwal al-islām*. His principal work, the *Ta'rīkh al-islām*, combining both general and biographical history, finishes in 700/1300-1 and, therefore, includes the whole history of the Mongol invasion. The value of his narrative is enhanced by his careful gathering of all sorts of information pertaining to his subject, and by himself being an eye-witness to the last phase of the Mongol invasion, QĀZĀN's attack on Damascus."

Sudhoff, Karl. ALEXANDER HISPANUS und das Schriftwerk unter seinem Namen. Ein erstes Wort über ihn und Bekanntgabe seiner medizinischen Schriften. *Archiv für Geschichte der Medizin* 29, 289-312, 1936 (to be cont'd). ISIS

XIVth century (second half)

Deztany, Lluis. ALCOATÍ. Libre de la figura del uyl. Text Català traduït de l'Àrab per Mestre JOAN JACME i conservat en un manuscrit del XIVn segle à la Biblioteca capitular de la Seu de Saragossa. Ara exhumat i presentat. Amb una notícia històrico-medical del JOSEP M. SIMON DE GUILLEUMA. 245 p. Barcelona, 1933. ISIS

See review of this work above in section XII (2). G. S.

Spies, Otto. An Arab account of India in the 14th century. Being a translation of the chapters on India from AL-QALQASHANDĪ's *Ṣubḥ Ul-a'shā*. 78 p. (*Bonner orientalistische Studien*, hrsg. von P. KAHLE und W. KIRFEL, 14). Stuttgart, KOHLHAMMER, 1936. ISIS

XVth century (whole and first half)

Birkenmajer, Aleksander. Processus magistri HENRICI BOHEMI. Seorsum impressum ex *Collectaneis Theologicis* 17, 207-24, Lwów, 1936. (in Czech, with Latin summary). ISIS

" Nomen magistri HENRICI BOHEMI, astrologi Cracoviensis, primum nobis innotuit ex Dlugossio, qui narrat eum primo, secundo et tertio puerperio reginæ SOPHIÆ (a. D. 1424-1427) adfuisse ac vaticinia de fatis filiorum eius protulisse. Nostris autem fere temporibus A. LEWICKI publici iuris fecit sententiam, quæ contra HENRICUM ab episcopo Cracoviensi SBIGNEO OLEŚNICKT ca. A. D. 1429 lata erat. Auctor præsentis articuli in cod. Bibl. Jagell. numero 2513 signato tria 'consilia' repperit, quæ STANISLAUS DE SCARBIMIRIA (d. 1431) contra nostrum astrologum scripserat, nec non indicem errorum, qui HENRICO adscribebantur. Quæ quatuor documenta multum valent ad vitam et doctrinam magistri HENRICI melius cognoscendam."

XVth century (second half)

Letts, Malcolm. The diary of JÖRG VON EHINGEN. Translated and edited. 71 p., 12 ills. London, Oxford University Press, 1936. ISIS

" JÖRG VON EHINGEN was born in A.D. 1428 of a noble Swabian family. His diary records his travels as a young man, between 1450 and 1460. These included, first, a visit to Rhodes, where he hoped to fight the Turk, and thence, since he found the Knights at peace, to Jerusalem and Cyprus, where he was received by King JAMES III. His second and greater expedition was to the Courts of France, Castile, and Portugal, under whose kings he took service against the Moors in Granada and Morocco. He distinguished himself, received many favours from ALFONSO V of Portugal and HENRY IV of Castile, and returned to his Swabian home by way of England, where he received an Order from HENRY VI, and Scotland, where he spent some time at the Court of JAMES II. His diary, which exists in manuscript at Stuttgart, is now translated into English for the first time. It contains a series of portraits of the kings he visited."

Stillwell, Margaret Bingham. GUTENBERG and the *Catholicon of* 1460. A bibliographical essay, together with an original leaf of the *Catholicon*. 28 p. folio, New York, Brick Row Book Shop, 1936. ISIS

Contents : GUTENBERG and the *Catholicon* of 1460; The *Catholicon* — its colophon and type; The GUTENBERG tradition as stated in the printed books of the fifteenth century; Registered copies of the *Catholicon* of 1460. Edition de luxe, each copy of which includes an original leaf of the *Catholicon*. Though Miss STILLWELL deals primarily with that particular book much of her paper applies as well to the 42-line Bible and to other books ascribed to GUTENBERG. It is thus a very valuable contribution to the GUTENBERG

literature. The author is in charge of one of the most important incunabula libraries in America, the Annmary Brown Memorial in Providence, R.I., and the very competent editor of the new census of incunabula available in the United States (see *Isis* 16, 178-81). G. S.

Weiss, R. Letters of LINACRE. *London Times Literary supplement*, p. 768, Sat. Sept. 26, 1936. ISIS

XVIth century (whole and first half)

A. — *Mathematics*

Loria, Gino. Intorno a due problemi geometrici proposti a N. TARTAGLIA. *Boll. d. mat., sezione storico-bibliografica* 32, lxi-lxiii, 1932.

B. — *Physical sciences and technology*

Bessmertny-Heimann, Bertha. L'esprit moderne chez BERNARD PALISSY. *Archeion* 18, 166-73, 1936. ISIS

Birkenmajer, Aleksander. Le premier système héliocentrique imaginé par NICOLAS COPERNIC. Odbitka z dzieła zbiorowego : La Pologne au VII[e] Congrès international des sciences historiques. 7 p. Varsovie, Société polonaise d'histoire, 1933. ISIS

" Le but de la présente communication est de résumer, devant un auditoire international, une petite partie des résultats auxquels ont abouti les recherches sur l'histoire de la découverte du système héliocentrique, par NICOLAS COPERNIC. Ces recherches, conduites simultanément par la double voie de l'analyse minutieuse des œuvres de COPERNIC et du dépouillement systématique des archives polonaises et étrangères, sont l'œuvre de mon père LOUIS ANTOINE BIRKENMAJER, mort en 1929. Il leur a consacré la moitié de sa vie et il a publié toute une série d'articles et de livres sur NICOLAS COPERNIC dont les principaux ont paru en 1900 et 1924. Malheureusement, ces livres écrits en polonais sont presque complètement inconnus en dehors de ma patrie. J'espère donc qu'on ne prendra pas en mauvaise part, si je profite de ce Congrès International réuni dans la capitale de la Pologne, pour attirer l'attention des historiens de la science, sur le fait que les travaux en question ont largement enrichi et profondément modifié l'ensemble de ce que nous savions auparavant sur la vie et surtout, sur l'évolution de la pensée créatrice du grand astronome. Afin d'illustrer ce fait, j'ai choisi comme sujet de ma communication une des plus importantes découvertes de mon père. Elle consiste dans la démonstration, que NICOLAS COPERNIC a conçu successivement deux systèmes héliocentriques du monde, très sensiblement différents l'un de l'autre." L'œuvre du père de l'auteur a été en partie analysée dans *Isis* 16, 136-38. G. S.

Birkenmajer, Aleksander. Primo systema heliocentrico imaginato ab NICOLA COPERNICO. *Schola et vita* 8, 233-39, 1933. ISIS

Birkenmajer, Aleksander. Jak Tworzył KOPERNIK? Nadbitka z XXI t. Nauki Polskiej, wydawn. Kasy im. Mianowskiego, 75-98, Warsaw, 1936. ISIS

Harig, G. Die Statik CARDANS und TARTAGLIAS. *Archives for the history of science*, 9, 23-7, 10 fig., 1936 (in Russian with German summary). ISIS

Noll-Husum, H. NOSTRADAMUS und die Astronomie. Ein Beitrag zur Methode der Astro-Chronologie. *Vierteljahrsschrift der Astronomischen Gesellschaft* 71, 242-49, 1936. ISIS

" Das Gesamtergebnis ist, dass (bis auf den soeben besprochenen Satz) die gesamten Konstellationsangaben der Nostradamusstelle für 1606 in den zulässigen Fehlergrenzen, die vor allem durch Benutzung anderer Tafeln bedingt sind, stimmen. Wir wissen heute mit der, so möchte ich sagen, astrologischen Geschichtsphilosophie des NOSTRADAMUS und seiner Zeit nichts mehr anzufangen. Seinen astronomisch-chronologischen Rechenoperationen aber an einem durchgeführten Beispiel zu folgen, ist auch heute noch für einige Stunden der geschichtlichen Rückschau interessant."

C. — *Natural sciences*

Cortesão, Armando. A hitherto unrecognized map by PEDRO REINEL in the British Museum. *Geographical journal* 87, 518-24, 1936. ISIS

Description of a coloured map of countries bordering Indian Ocean drawn circa 1518, showing several islands for the first time. C. W. A.

Kammerer, A. Le routier de Dom JOAM DE CASTRO. L'exploration de la mer rouge par les Portugais en 1541. Traduit du portugais d'après le manuscrit du British Museum avec une introduction historique et des notes critiques de géographie. 202 p., 21 pl., 4 fig. (reproduisant les dessins originaux de l'amiral DE CASTRO). Paris, GEUTHNER, 1936. ISIS

Winter, Heinrich. Das falsche Labrador und der schiefe Meridian. *Forschungen und Fortschritte* 12, 117-19, 3 fig., 1936. ISIS

D. — *Medical sciences*

Clemen, Otto. Ein Rezept gegen die Pest von PHILIPP MELANCHTON. *Archiv für Geschichte der Medizin* 29, 350-54, 1936. ISIS

Clemen, Otto. Der Wittenberger Medizinprofessor MELCHIOR FEND (1486-1564). *Archiv für Geschichte der Medizin* 29, 334-40, 1936. ISIS

Guttmacher, Alan F. AMBROISE PARÉ does a delivery. *Bulletin of the institute of the history of medicine* 4, 703-17, 1936. ISIS

Kepp, Friedrich Victor. O socoteală înedită a Spitalului Sibian din anii 1537-1538. 36 p. Universitatea " Regele Ferdinand I " din Cluj, facultatea de medicină şi farmacie, 1934. ISIS

An edition of an account book (in German) of the Hospital in Sibiu (Transylvania) from the year 1537 to 1538. M. C. W.

Neuburger, Max. GOMEZ PEREIRA, ein spanischer Arzt des XVI. Jahrhunderts. *Archeion* 18, 113-16, 1936. ISIS

Pina, Luiz de. A medicina portuguesa de além mar no século XVI. *Biblioteca geral da Universidade* 9, 36 p., Coimbra, 1935. ISIS

Schlueter, Robert E. The first aphorism of HIPPOCRATES as explained by PARACELSUS. *Annals of science* 1, 453-61, 1936. ISIS

Sudhoff, Karl. PARACELSUS-Bildnisse. *Münchene medizinischen Wochenschrift* no. 2, 7 p., fig., 1936. ISIS

Thorndike, Lynn. JOHANN VIRDUNG of Hassfurt again. *Isis* 25, 363-71, 1936. ISIS

" In his article, ' Formula,' published not long since in *Isis*, (19, 364-378) ALEXANDER BIRKENMAJER devoted much space to JOHANN VIRDUNG of Hassfurt (c. 1485-c. 1535) concerning whose life he stated that we still lack sufficient information, although he himself supplied a number of details. It is my purpose to present some further data as to VIRDUNG's career and character from manuscripts which were once owned by him or were written in his own hand."

Weisz, Alexandru I. The principles of PARÉ's surgery. 20 p. Universitatea " Regele Ferdinand I " din Cluj, facultatea de medicină. Cluj, ALBERT, 1935 (in Rumanian, with French summary). ISIS

XVIth century (second half)

A. — *Mathematics*

Inglis, Alex. NAPIER's education, a speculation. *Mathematical gazette*, 20, 132-34, 1936. ISIS

Suggests that NAPIER met SIMON STEVIN, MICHAEL STIFEL and JOHANN SCHEUBEL when finishing his education in Flanders and Germany about 1564. C. W. A.

B. — *Physical sciences and technology*

Gunther, R.T. The newly found astrolabe of Queen ELIZABETH. A sixteenth century navigational instrument, one of the finest of its kind, discovered at Oxford : the only extant work by THOMAS GEMINI. *The illustrated London news*, Oct. 24, 1936, p. 738-39, 6 illus. ISIS

C. — *Natural sciences*

Durand, Dana B. Was Bering Strait known in the sixteenth century? *Geographical review* 26, 690, 1936. ISIS

Zimmermann, Walther. Das Anfangsherbarium des HIERONYMUS HARDER. *Gesellschaft für Geschichte der Pharmazie, Vorträge*, Stuttgart, 1936, p. 47-54. ISIS

Includes a chronological list of the oldest herbaria from c. 1538 to 1599. G. S.

D. — *Medical sciences*

Edgar, Irving I. Elizabethan conceptions of the physiology of the circulation. *Annals of medical history* 8, 456-65, 1936. ISIS

Giordano, D. Ancora sulla pietra sepolcrale di GIOVANNANDREA DALLA CROCE. *Rivista di storia delle scienze mediche e naturali* 27, 242, 1936. ISIS

Subklew, Werner. Das zweite Rossarzneibuch Graf WOLFGANGS II. von Hohenlohe. *Quellen und Studien zur Gesch. der Naturwissenschaften und der Medizin* 5, 126-288, 1936. ISIS

E. — *Alia*

Leschmann, W. CERVANTES, Dichter und Arzt? Zu seinem 320. Todestage am 23. April 1936. *Archiv für Geschichte der Medizin* 29, 256-70, 1936. ISIS

Thompson, Edward. Sir WALTER RALEGH : The last of the Elizabethans. xvi+387 p., 6 pl. London, MACMILLAN, 1935. ISIS

Reviewed by FRANCIS R. JOHNSON, *Isis* 25, 465-66, 1936.

XVIIth century (whole and first half)

A. — *Mathematics*

Stamm, Edward. JOHANNES BROSCIUS (1585-1652). *Archeion* 18, 174-83, 1936. ISIS

B. — *Physical sciences and technology*

Helmont, J.B. van. A propos d'une édition liégeoise de l'Ortus de VAN HELMONT. *Le folklore brabançon* 16, 153, 1936. ISIS

Lippmann, Edmund O. von. Die Entdeckung des Milchzuckers. *Isis* 25, 459, 1936. ISIS

Loria, Gino. GALILEO GALILEI nella vita e nelle opere. 68 p. Pavia, Premiata Tipografia Succ. Fratelli FUSI, 1936. ISIS

A sketch of GALILEO's life and work by one of the leading historians of science of our days. It is divided as follows : Proemio. I. Un' alba radiosa. — II. Un meriggio fecondo. — III. All' ombra di un trono. — IV. Prodromi di tempesta. — V. L'uragano. — VI. Uno squallido tramonto. — VII. Nell' insidiata pace del sepolcro. — Epilogo."

Mott, R.A. DUD DUDLEY (1599-1684) and the early coal-iron industry. *Transactions of the Newcomen society* 15, 17-37, 1 fig., 1934-35. ISIS

Partington, J.R. JOAN BAPTISTA VAN HELMONT. *Annals of science* 1, 359-84, 1936. ISIS

" When we review the work of VAN HELMONT, we cannot deny that he represents the transition from alchemy to chemistry, and is a worthy predecessor of BOYLE, who studied him carefully and adopted many of his ideas. That he was 'a great chemist, undoubtedly the greatest prior to LAVOISIER' is an over-statement which VAN HELMONT himself would, if he could look back over the period between his experiments at Vilvorde and the work of the great Frenchman, be the first to correct."

Patterson, T.S. VAN HELMONT's ice and water experiments *Annals of science* 1, 462-67, 1936. ISIS

D. — *Medical sciences*

Adut, Albert. FRANÇOIS THÉVENIN als Chirurg. *Institut f. Gesch. d. Med.* 29 p., Leipzig, 1935. ISIS

Mead, Kate C.H. Query no. 61. The dates of birth and death of JOHANNES SCULTETUS (1595-1645?). *Isis* 25, 452-54, 2 ills., 1936. ISIS

Radbill, Samuel X. The barber surgeons among the early Dutch and Swedes along the Delaware. *Bulletin of the institute of the history of medicine* 4, 718-44, 7 fig., 1936. ISIS

E. — *Alia*

Ferran, Come. Les médecins de Lyon et la baguette divinatoire au XVII[e] siècle. *Bull. de la soc. franç. d'hist. de la méd.* 33, 225-43, 1936. ISIS

Morison, Samuel Eliot. The founding of Harvard College. (xxvi+472 p., ills., maps.; Harvard College in the seventeenth century. 2 vols., xxii+708 p., ills. Cambridge, Harvard University Press, 1935; 1936. ISIS

Reviewed by GEORGE SARTON, *Isis* 25, 513-20, 4 fig., 1936.

Young, R. Fitzgibbon. The invisible college (1645-1660). *Times Literary supplement*, December 12, p. 1035, London, 1936. ISIS

XVIIth century (second half)

A. — *Mathematics*

Brunet, Pierre. La correspondance des BERNOULLI. *Archeion* 18, 185-87, 1936. ISIS

Sergescu, Petre. Les mathématiques dans le " Journal des savants" 1665-1701. *Archeion* 18, 140-45, 1936. ISIS

Resumé de l'étude publie dans *Osiris*, vol. 1.

Taylor, Lloyd W. NEWTON's prism in the British Museum. *Nature* 138, 585, 1936. ISIS

B. — *Physical sciences and technology*

Brugmans, Henri L. Le séjour de CHRISTIAN HUYGENS à Paris et ses relations avec les milieux scientifiques français suivi de son journal de voyage à Paris et à Londres. 200 p. Paris, DROZ, 1935. ISIS

(Guericke, Otto von). Die GUERICKE-Ausstellung des Deutschen Museums in München. *Mitt. zur Gesch. der Med., der Naturw., u. d. Techn.* 35, 379-81, 1936. ISIS

Gunther, R.T. Early science in Oxford, vol. X. The life and work of ROBERT HOOKE (part IV). xliv+294 p. Oxford, 1935. ISIS

Reviewed by J. PELSENEER, *Isis* 25, 466-70, 1936.

Robinson, Henry W.; Adams, Walter. The diary of ROBERT HOOKE (1672-1680). xxviii+527 p. London, TAYLOR & FRANCIS, 1935. ISIS

Reviewed by J. PELSENEER, *Isis* 25, 466-70, 1936.

C. — *Natural sciences*

Wenhold, Lucy L. A 17th century letter of GABRIEL DIAZ VARA CALDERÓN, Bishop of Cuba, describing the Indians and Indian missions of Florida. Transcribed and translated. *Smithsonian miscellaneous collections* 95, 14 p., 12 pl. Washington, D.C., 1936. ISIS

D. — *Medical sciences*

Battistini, Mario. Medici ciarlatani e ciarlatani medici del sec. XVII. Il marchese NICCOLÒ CEVOLI DEL CARRETTO in Francia ed in Belgio. *Rivista di storia delle scienze mediche e naturali* 27, 243-55, 1936. ISIS

Heringa, G.C.; Mendels, J.I.H. REGNIER DE GRAAF's onderzoekingen over follikel en corpus luteum. *Bijdragen tot de geschiedenis der geneeskunde* 16, 184-90, 3 fig., 1936. ISIS

Teed, R. Wallace. The otology of DUVERNEY. *Annals of medical history* 8, 453-55, 1936. ISIS

E. — *Alia*

Brown, Harcourt. MARTIN FOGEL e l'idea accademica Lincea. 20 p. (Reale Accademia nazionale dei Lincei, Estratto dal Rendiconti della classe di scienze morali, storiche e filologiche, 11). Rome, BARDI, 1936. ISIS

Wendriner, Karl Georg. SPINOZA und der deutsche Geist. *Neue Züricher Zeitung* 23, Juni, p. 1, 1936 (Morgensausgabe no. 1080). ISIS

XVIIIth century (whole and first half)

B. — *Physical sciences and technology*

Bloch, Max. Unveröffentliche Manuskripte von BOERHAAVE und FAHRENHEITS Briefe an BOERHAAVE. *Archeion* 18, 184-85, 1936. ISIS

D'Esaguy, Augusto. A short note on ISAAC DE SEQUEIRA SAMUDA. *Bulletin of the institute of the history of medicine* 4, 783-88, 1 fig., 1936. ISIS

Portuguese astronomer and physician who practised in London. G. S.

Farrand, Max. BENJAMIN FRANKLIN's memoirs. 78 p., 2 facs. *Huntington Library Bulletin* no. 10, 1936. ISIS

Introductory study to the new edition of the *Memoirs* to be published by the Huntington Library which possesses the original MSS. Says the author : " Few, if any, documents of modern times have been subjected to such gross and persistent misrepresentations as has fallen to the lot of BENJAMIN FRANKLIN's autobiographiy. This has been due primarily to the different times of its composition and to the unparalleled confusion attending its publication. FRANKLIN wrote his ' memoirs' as he always referred to them, at four distinct periods. There was an interval of thirteen years between the first and second parts, then a lapse of four years more before the third part was begun; the last part was added just before he died. After his death, the publication of the autobiography was eagerly awaited, as its existence was widely known, but for nearly thirty years the reading public had to content itself with French translations of the first and second parts, which were again translated from the French into other languages, and even retranslated into English. When the authorized English publication finally appeared in 1818, it was not taken from the original manuscript but from a copy, as was the preceding French version of the first part. The copy, furthermore, did not include the fourth and last part, which also first reached the public in a French translation in 1828. It seems incredible that three of the four parts of this great American classic should have been published first in French translations; yet such is the case, and the complete autobiography was not printed in English from the original manuscript until 1868, nearly eighty years after FRANKLIN's death."

Gomme, A.A. Patent practice in the 18th century : the diary of SAMUEL TAYLOR, threadmaker and inventor, 1722-1723. *Transactions of the Newcomen society* 15, 209-24, 1934-35. ISIS

Young, W.A. LIDSTONE's pamphlets on NEWCOMEN. *Transactions of the Newcomen society* 15, 67-71, 4 fig., 1934-35. ISIS

C. — *Natural sciences*

Falkner, Thomas. A description of Patagonia and the adjoining parts of South America. Edited by ARTHUR E. S. NEUMANN. iv+168 p. Chicago, ARMANN and ARMANN, 1935 (facsimile reprint of the original edition, Hereford, 1774). ISIS

Reviewed by L. G. C. LAUGHTON, *Geographical journal* 88, 81-2, 1936. Jesuit medical missionary among the Indians circa 1740-60. Notes on ethnology and fauna and flora. C. W. A.

Jussieu, Joseph (1704-79). Description de l'arbre à quinquina. Mémoire inédit de JOSEPH DE JUSSIEU (1737). 45 p., 12 facs. Publié en commémoration du centenaire de la Marque des 3 cachets par la Société du traitement des Quinquinas, Paris, 18, rue Malher, 1936. ISIS

Ce mémoire de JOSEPH DE JUSSIEU, écrit en Latin en 1737, *Descriptio arboris kinakina* était resté inédit dans les archives du Muséum. Il est publié ici en facsimile avec une traduction française, une introduction, et un épilogue fort intéressant. G. S.

(Linnaeus). An index to the authors (other than LINNAEUS) mentioned in the catalogue of the works of LINNAEUS, preserved in the libraries of the British Museum. 2nd edition, 1933. 59 p. London British Museum, 1936. ISIS

D. — *Medical sciences*

Artelt, Walter. Die anatomisch-pathologischen Sammlungen Berlins im 18. Jahrhundert. *Klinische Wochenschrift* 15, 11 p., 1936. ISIS

Hönncher, E. JOHANN TIMMES Cogitationes medico-physico-historicae, Bremen 1752. *Archiv für Gesch. der Medizin* 29, 216-23, 1936. ISIS

Irissou, M. Perplexité. *Bull. de la soc. franç. d'hist. de la méd.* 34, 289-92, 1936. ISIS

Apropos of two Montpellier doctors, father and son, JACQUES SÉRANE (1680-1754) and CHARLES SÉRANE (1714-1756). G. S.

Münzenmayer, Hugo. Über ärztliches Zunftwesen im 18. Jahrhundert. *Archiv für Geschichte der Medizin* 29, 341-47, 1936. ISIS

Mullett, Charles F. The English plague scare of 1720-23. *Osiris* 2, 484-516, 4 fig., 1936. ISIS

XVIIIth century (second half)

B. — *Physical sciences and technology*

Diergart, Paul. Begründung der Bonner Chemie durch FERDINAND WURZER um 1790. *Archiv für Geschichte der Medizin* 29, 113-22, 1936. ISIS

Gliozzi, Mario. GIOVANNI FABBRONI e la teoria chimica della pila. *Archeion* 18, 160-65, 1936. ISIS

Menschutkin, Boris N. VASILIJ VLADIMIROVIČ PETROV (1761-1834) and his physico-chemical work. *Isis* 25, 391-98, 1 pl., 4 fig., 1936. ISIS

Biography of a Russian chemist and physicist who is still practically unknown abroad. " No mention of his name is found in any history of chemistry. In spite of this he is the man who put the finishing touches to the new chemistry by experimentally removing the ' paradoxes ' incompatible with it. "

Neave, E.W.J. JOSEPH BLACK's lectures on the elements of chemistry. *Isis* 25, 372-90, 1 pl., 1936. ISIS

Analysis of that treatise published in 2 vols., Edinburgh 1803, and of special interest because it represents a period of transition. " Black introduces us to many of the modern chemical ideas, although the older doctrines of iatro-chemistry, phlogiston and caloric were accepted in his lifetime." G. S.

Pendred, L. St. L. The order book of the new wire company, Cheadle, 1788-1831. *Transactions of the Newcomen society* 15, 99-116, 1 fig., 1934-35. ISIS

Thompson, James A. Count RUMFORD of Massachusetts. xvi+275 p., 10 ills. New York, FARRAR and RINEHART, 1935. ISIS

Reviewed by CHAUNCEY D. LEAKE, *Isis* 25, 470-71, 1936.

Titley, A. The passing of Austhorpe Lodge. *Transactions of the Newcomen society* 15, 229-31, 1 fig., 1934-35. ISIS

Apropos of the civil engineer JOHN SMEATON (1724-92). G. S.

Zeitlin, E. English and French flax spinning machines in the epoch of the industrial revolution. *Archives for the history of science* 9, 205-57, 18 fig., 1936 (in Russian with English summary). ISIS

C. — *Natural sciences*

Bache, Franklin. Where is FRANKLIN's first chart of the Gulf Stream? *Proceedings of the American philosophical society* 76, 731-41, 3 maps, 1936. ISIS

" Doctor FRANKLIN, Deputy Postmaster-General of the Colonies, in 1769, was in England and there heard complaints from America that westbound mail packets took two weeks longer in crossing than did American merchant ships. A Captain FOLGER, a Nantucket whaler, being in London, FRANKLIN inquired of him and received the suggestion that the delay was due to the English packets breasting the Gulf Stream, which they continued to do notwithstanding that the American whaling captains told them of it and advised them how to avoid it, but the English captains ' were too wise to be counseled by simple American fishermen.' FRANKLIN thereupon procured the engraving of the first chart of the Stream. No example of this chart can be found in any of the great collections. It is hoped one may be brought to light. FRANKLIN, while in his seventies, in the course of three North Atlantic crossings, took observations of the water temperature as the ship entered and left the Gulf Stream, with the idea that navigators by doing the same could be warned of the approach to the American Coast, and could use or avoid the Stream, according to the direction in which they were going. He stated his theory of the cause of the Stream which after 160 years of observation is accepted. Thus an American had the first chart of the Stream engraved, made the first scientific observations of it and was the first to ascribe correctly its cause."

Böker, Hans. GOETHES Beziehungen zur Anatomie und zum Anatomischen Institut zu Jena. *Archiv für Geschichte der Medizin* 29, 123-35, 3 fig., 1936. ISIS

Černikov, A. From the history of Arctic explorations. (An unpublished map of an expedition to the Bear Islands in 1769). *Archives for the history of science* 9, 365-73, 1936 (in Russian with English summary). ISIS

Middleton, William S. BENJAMIN SMITH BARTON. *Annals of medical history* 8, 477-91, 3 fig., 1936. ISIS

D. — *Medical sciences*

Bixler, Elizabeth S. A forerunner of psychiatric nursing, JOAN-

BAPTISTE PUSSIN (1746-18-?). *Annals of medical history* 8, 518-19, 1936. ISIS

Bologa, Valeriu L. Raportul din 1756 al unui chirurg german despre credinţele românilor asupra moroilor. Extras din *Anuarul arhivei de folklor* 3, 159-68 (received Jan. 1937). ISIS

Concerning GEORG TALLAR's book, *Visum repertum anatomico-chirurgicum oder gründlicher Bericht von den sogenannten Blutsäugern, Vampier,.... in der Wallachey, Siebenbürgen, und Banat*, written 1756, first printed 1784. M. C. W.

Dann, Georg Edmund. KLAPROTHS Ahnen und Familienkreis. *Gesellschaft für Geschichte der Pharmazie, Vorträge*, Stuttgart, 1936, p. 1-6. ISIS

Diepgen, Paul. CHRISTOPH WILHELM HUFELAND und die Medizin seiner Zeit. Zur 100. Wiederkehr seines Todestages am 25. August 1936. *Münchener medizinische Wochenschrift* no. 3516 p., 1936. ISIS

Gallois, P. Présentation de deux cahiers de cours de matière médicale datant de 1763-64. *Bull. de la soc. franç. d'hist. de la méd.* 34, 306-09, 1936. ISIS

Haller, Albrecht von. A dissertation on the sensible and irritable parts of animals. *Bulletin of the institute of the history of medicine* 4, 651-99, 1936. ISIS

Reprint of the anonymous English translation (London 1755) of HALLER's main physiological work, *De partibus corporis humani sensibilibus et irritabilibus* (Goettingen 1752). That translation was made from the French version by HALLER's friend SIMON ANDRÉ TISSOT (Lausanne 1755). The French version had been preceded by others in Swedish and German. Hence by 1755 HALLER's classic could be read everywhere. G. S.

Hobhouse, Rosa Waugh. Life of CHRISTIAN SAMUEL HAHNEMANN, founder of homoeopathy. With a preface by Sir JOHN WEIR. 288 p., ills. London, DANIEL, 1933. ISIS

Popular biography largely derived from the works of the late RICHARD HAEHL (2 vols., Leipzig 1922), and THOMAS LINDSLEY BRADFORD, (Philadelphia 1895). Says Sir JOHN " It is difficult, even now, to estimate the influence on medicine of SAMUEL HAHNEMANN, whose ' glorious discontent' with the therapeutics of his day was such that he gave up everything in the endeavour to find ' if God had not indeed given some certain law by which the diseases of mankind could be cured.' And to this patient genius the

Law of Healing in time revealed itself, and to the elucidation of that Law he thereafter devoted his long life."

Pina, Luiz de. Un manuscrito do século XVIII sôbre flora médica timorense. III congresso internacional de história das ciências, em Portugal 9 p., 6 fig. Lisbon, 1936. ISIS

Pleadwell, F.L. Another letter from JOHN HUNTER, *Annals of medical history* 8, 562, 1936. ISIS

Van der Hoeven, J. ARNOLDUS SOEK (1760-1795), " beroemd heel- en vroedmeester te Leiden." *Bijdragen tot de geschiedenis der geneeskunde* 16, 177-83, 1936. ISIS

Wood, S. A link with JENNER. *Annals of medical history* 8, 433-41, 3 fig., 1936. ISIS

XIXth century (whole and first half)

A. — *Mathematics*

Loria, Gino. Le mathématicien J. LIOUVILLE et ses œuvres. *Archeion* 18, 117-39, 1936. ISIS

Polak, L.S. W. R. HAMILTON and the principle of stationary action. 272 p. (Transactions of the Institute for the history of science and technology, series 2, issue 8). Moscow, Academy of sciences press, 1936 (in Russian). ISIS

Elaborate study on Sir WILLIAM ROWAN HAMILTON (1805-65), unfortunately in Russian followed by a bibliography of 149 items which is naturally in English. G. S.

B. — *Physical sciences and technology*

(Ampère, André-Marie). Bulletin de la Société des amis d'ANDRÉ-MARIE AMPÈRE. No. 1, juin 1931. Malakoff, Seine, 8 à 14, Avenue Pierre-Larousse. ISIS

Ce Bulletin, dont six fascicules (en tout 181 p.) ont paru depuis 1931, contribue d'heureuse façon à perpétuer la mémoire du fondateur de l'électrodynamique. J. P.

(Ampère, André Marie). Correspondance du grand AMPÈRE. Publiée par L. DE LAUNAY avec le concours de l'Académie des

sciences (Fondation Loutreuil) et du ministère de l'éducation nationale, vol. 1, xii+383 p., pl. Paris, GAUTHIER-VILLARS, 1936. ISIS

Bootsgezel, J.J. The cruquius engine and its history. *Transactions of the Newcomen Society* 15, 1-16, 3 fig., 1934-35. ISIS

Delépine, Marcel. Une étape de la notion d'atome et de molécule: GAUDIN. *Bull. soc. chim.* (5) 2, 1-15, 1935. ISIS

Reviewed by T. L. DAVIS, *Isis* 25, 471-73, 1936.

(Faraday, M.). London University degrees : a FARADAY letter. By T.M., *Nature* 138, 710-11, 1936. ISIS

Faure, Gabriel. Le cent cinquantenaire de MARC SEGUIN. *L'illustration* 94, no. 4886, p. 237, ill., 24 oct., 1936. ISIS

Gabriel, Ralph H. The founding of Holyoke 1848. 23 p. The Newcomen Society, American Branch, 1936. ISIS

Henshaw, D.M. Donkin pantagraph engraving machine, with rose engine. *Transactions of the Newcomen society* 15, 77-83, 3 fig., 1934-35. ISIS

(Humboldt, Alexander von). HUMBOLDT's plan in 1836 for a world magnetic survey. *Nature* 138, 894, 1936. ISIS

Lippmann, Edmund O. von. Ehemalige Zucker-Raffination zu Frankfurt a.M. *Die Deutsche Zuckerindustrie* no. 46, p. 1084, 1936. ISIS

Lippmann, Edmund O. von. Zur Erinnerung an CHEVREUL. *Fette und Seifen*, H. 9, 149, 1936. ISIS

Personal reminiscences. Dr. E. O. v. LIPPMANN actually met CHEVREUL in Dunkerque in 1878. CHEVREUL was born in 1786 and died in 1889 (*Isis* 8, 333, fig. 1-2). May Dr. v. LIPPMANN follow his example of longevity!
G. S.

Newbould, G.T. The atmospheric engine at Parkgate. *Transactions of the Newcomen society* 15, 225-28, 1 fig., 1934-35. ISIS

Pelseneer, J. Notes on some unpublished letters from FARADAY to QUETELET. *Annals of science* 1, 447-52, 1936. ISIS

Quarendon, R. J. L. MACADAM : father of modern roadmaking. *Nature* 138, 869-70, 1936. ISIS

Vermeule, Cornelius C. The Morris canal. *Transactions of the Newcomen society* 15, 195-202, 1934-35. ISIS

Weeks, Mary Elvira. Some scientific friends of Sir WALTER SCOTT. *Journal of chemical education* 13, 503-07, 4 fig., 1936. ISIS

C. — *Natural sciences*

Cheynier, André. JOUANNET, grand-père de la préhistoire. 101 p., pl., facs. Brive, Chastrusse, Praudel, 1936. ISIS

Hykeš, O.V. JAN EVANGELISTA PURKYNĚ (PURKINJE) (1787-1869). His life and his work. *Osiris* 2, 464-71, port., 1936. ISIS

Strohl, Jean. LORENZ OKEN (1779-1851) und GEORG BÜCHNER. Zwei Gestalten aus der Übergangszeit von Naturphilosophie zu Naturwissenschaft. 106 p., 1 pl., 5 ills. Zürich, Verlag der Corona, 1936. (RM 4.) ISIS

" In den hundert Jahren seit BÜCHNERS Tod wurden Wesen und Bedeutung seiner Dichtung erkannt. Die Leistung des Naturforschers aber wird hier zum ersten Male innerhalb grösserer Zusammenhänge erfasst. Professor STROHL zeichnet die Entwicklung von der romantischen Naturphilosophie zur modernen Naturwissenschaft und stellt zugleich die eigenartige Gestalt OKENS neu ins Licht. Er bereichert die Geschichte der Dichtung und der Wissenschaft durch eine nach vielen Richtungen ausstrahlende Untersuchung wie durch den sehr seltenen Fund unbekannter Briefe BÜCHNERS."

Studnička, F.K. J. E. PURKINJE's " Physiology " and his services to science. *Osiris* 2, pt. 10, 472-83, 1936. ISIS

D. — *Medical sciences*

Bourges, Henry. Journal de route d'un médecin des armées de NAPOLÉON (1803-1810). *Bull. de la soc. franç. d'hist. de la méd.* 34, 293-302, 1936. ISIS

Apropos of the author's grandfather JOSEPH BOURGES (born 1776). G. S.

Brunn, W. von. Die Chirurgenfamilie LANGENBECK. *Die medizinische Welt* Nr. 15, 11 p., 1936. ISIS

Karl, Ludwig. Vom Heeressanitätswesen während der österreichischen Besetzung im Elsass und von einem Dichterarzt (1818). *Die medizinische Welt*, 10 p., 1936. ISIS

Loew, J. Walter. Câteva documente oficiale referitoare la Transilvania din timpul epidemiei de ciumă din anii 1813-1814. 47 p. Universitatea " Regele Ferdinand I " din Cluj, facultatea de medicină. Cluj, Tip. Universala, 1936. ISIS

Various official documents, in Rumanian, German, Latin, Hungarian, etc. concerning the plague of 1813-14 in Transylvania. M. C. W.

E. — *Alia*

Schmidt, George P. Intellectual crosscurrents in American colleges, 1825-1855. *American historical review* 42, 46-67, 1936. ISIS

Stern, Bernhard. J. A note on COMTE. *Science & society* 1, 114-19, 1936. ISIS

XIXth century (second half)

A. — *Mathematics*

Čebyšev, P.L. The cutting out of garments. *Archives for the history of science* 9, 347-63, 1936 (in Russian with English summary). ISIS

Translation of a French paper written by the great mathematician P. L. CHEBYSHEV in Paris 1878. The paper discusses the question of designing patterns for textile materials in taking their physical properties into account. G. S.

B. — *Physical sciences and technology*

Abbot, C.G. SAMUEL PIERPONT LANGLEY. 57 p., 6 pl. (*Smithsonian miscellaneous collections*, 92). Washington, Smithsonian Institution, 1934. ISIS

Heindel, Richard Heathcote. From the correspondence of OLIVER WOLCOTT GIBBS (1822-1908). *Science* 84, 266-68, 1936. ISIS

Mieli, Aldo. Lettere inédite di STANISLAO CANNIZZARO e di EMANUELE PATERNÒ ad ADOLF LIEBEN. *Archeion* 18, 188, 1936. ISIS

Mladenzev, M.N. D. I. MENDELEEV's half-sagene "Π_4". *Archives for the history of science* 9, 343-46, 1936. (in Russian with English summary). ISIS

"The D. I. MENDELEEV's half-sagene 'Π_4' of platinum-iridium alloy is a unique standard in the world. It is the most authoritative and indispensable connecting link in the history of metrology between the metric system, the English system and the old Russian measures."

Orrok, Geo. A. Engineering recollections : an informal address. *Transactions of the Newcomen society* 15, 153-67, 1934-35. ISIS

Turpain, Albert. La célébration de NICOLAS TESLA en Yougoslavie. *Revue générale des sciences* 47, 459-63, 3 fig., 1936. ISIS

Van't Hoff, J.H. Etudes de dynamique chimique. 178 p., port., 28 fig. Leningrad, Onti-Khimtheoret, 1936 (bound, rbl. 4.60) (in Russian). ISIS

The original French edition of this important work appeared in Amsterdam, in 1884. The Russian translation was made, under the editorship of N. N. SEMENOV, by M. A. BLOKH and J. B. KHARITON; the ambiguous wording, found on the title-page, does not exclude the possibility that BLOKH and KHARITON were co-editors, and that the names of the translators are not mentioned. The work was carefully translated and edited; there are valuable additional footnotes. N.N. SEMENOV contributed a short introduction (3 p.); M. A. BLOKH wrote the 20-page biographical sketch of VAN'T HOFF which precedes the translation. There is, unfortunately, no index. A. P.

C. — *Natural sciences*

Brewster, William. October farm. 300 p., ills. Cambridge, Harvard University Press, 1936. ISIS

Reviewed by F. M. C., *Natural history* 39, 73, 1937.

Gaissinovitsch, A. GREGOR MENDEL and his forerunners. Reprint from a book : A. SEGARET, CH. NAUDIN and GR. MENDEL. Selected papers on plant hybrids. Introduction and commentary by A. GAISSINOVITSCH. 356 p., Moscow, State Publishing House, 1935. (in Russian). ISIS

Hobbs, William Herbert. PEARY. 517 p., map., ills. New York, MACMILLAN, 1936. ISIS

Reviewed by J. T. N., *Natural history* 39, 72, 1937.

Osborn, Henry Fairfield (1857-1935). Fifty-two years of research, observation and publication, 1877-1929. A life adventure in breadth and depth. Edited by FLORENCE MILLIGAN. With complete bibliography, chronologic and classified by subject, 1877-1929. xii+160 p., illus., port. New York, SCRIBNER's, 1930 ($ 1.50). ISIS

Supplement for the years 1930-34, p. 54 to 45 h

(Pelseneer, Paul). Mélanges PAUL PELSENEER. Mémoires du Musée royal d'histoire naturelle de Belgique. Deuxième série, fasc. 3, 1206 p. Bruxelles, 1936. ISIS

J. P.

D. — *Medical sciences*

Boyd, J. D. WILHELM VON WALDEYER. *Nature* 138, 761, 1936. ISIS

On the subject WALDEYER vs. RAMÓN Y CAJAL. G. S.

Brunn, W. v. ROBERT KOCH zur 25. Wiederkehr seines Todestages. *Riedel-Archiv* 24, 33-7, 3 fig., 1935. ISIS

Brunn, W. v. THEODOR BILLROTH. Sonderdruck aus der *Münchener Medizinischen Wochenschrift* no. 22, 11 p., 1 port., 1936. ISIS

Gibson, William Carleton. SANTIAGO RAMÓN Y CAJAL (1852-1934). *Annals of medical history* 8, 385-94, 1936. ISIS

Kepp, Richard. Ştiri medicale şi sanitare din războiul Independenţii în gazetele săseşti din Ardeal. 41 p. Universitatea " Regele Ferdinand I " din Cluj, facultatea de medicina, 1935. ISIS

A collection of newspaper accounts (in German) of military sanitation during the war of 1877-1878. M. C. W.

Rosen, George. CARL LUDWIG and his American students. *Bulletin of the institute of the history of medicine* 4, 609-50, 1936. ISIS

Terrillon, Maurice. Note sur la découverte de l'asepsie. *Bull. de la soc. franç. d'hist. de la méd.* 34, 303-05, 1936. ISIS

(Thayer, William S.). Bibliography of the writings of Dr. WILLIAM S. THAYER, compiled by EFFIE SMITHER HUNLEY. *Bulletin of the institute of the history of medicine* 4, 751-81, 1936. ISIS

E. — *Alia*

Goldman, Leon. War and science. RUDOLPH VIRCHOW. *Annals of medical history* 8, 558-61, 1936. ISIS

Morison, Samuel Eliot. The development of Harvard University, 1869-1929. xc+660 p., ills. Cambridge, Harvard University Press, 1930. ISIS

Reviewed by GEORGE SARTON, *Isis* 25, 513-20, 4 fig., 1936.

XXth century

A. — *Mathematics*

Hilbert, David. Gesammelte Abhandlungen. III. Analysis. Grundlagen der Mathematik. Physik. Verschiedenes nebst einer Lebensgeschichte. vii+435 p. Berlin, SPRINGER, 1936. ISIS

Reviewed by L. J. MORDELL, *Mathematical gazette*, 20, 213-15, 1936. Includes HILBERT's obituary notices of MINKOWSKI, HURWITZ, WEIERSTRASS, DARBOUX, and a life of HILBERT by BLUMENTHAL. C. W. A.

B. — *Physical sciences and technology*

Booth, H. Cecil. The origin of the vacuum cleaner. *Transactions of the Newcomen society* 15, 85-98, 3 fig., 1934-35. ISIS

Cox, J.F. Notice sur la vie et les travaux de PAUL STROOBANT (1868-1936). Rapport de l'Université libre de Bruxelles sur l'année académique 1935-36, 8 p. Edition de l'Université. ISIS
J. P.

Lieben, Fritz. Briefwechsel zwischen ADOLF LIEBEN und ALFRED NAQUET. *Archeion* 18, 190-91, 1936. ISIS

McGee, J.D. Campbell Swinton (-1930) and television. *Nature* 138, 674-76, 1936. ISIS

Rutherford, Lord. Science in development. *Nature* 138, 865-69, 1936. ISIS

From the twelfth annual NORMAN LOCKYER lecture of the British science Guild, delivered on November 12.

Sherrill, Miles S. The contributions of ARTHUR A. NOYES to science. *Science* 84, 217-20, 1936. ISIS

C. — *Natural sciences*

Dayton, William A. WILLIAM WILLARD ASHE (1872-1932). 22 p., port. Mimeographed edition without place, dated Nov. 27, 1936. ISIS

Haldane, John Scott (1860-1936). Obituary by D'ARCY WENTWORTH THOMPSON. *The Edinburgh Academy Chronicle*, 6 p., June 1936. ISIS

Turley, Charles. ROALD AMUNDSEN, explorer. 218 p. London, METHUEN & Co., 1935. ISIS

Reviewed by F. DEBENHAM, *Geographical journal* 88, 88, 1936.

E. — *Alia*

Jaffe, Bernard. Outposts of science : a journey to the workshops of our leading men of science. xxvi+547 p., 32 pl. New York, SIMON and SCHUSTER, 1935. ISIS

Reviewed in *Nature* 138, 740-41, 1936.

Renou, L. SYLVAIN LÉVI (1863-1935) et son œuvre scientifique. *Journal asiatique* 228, 1-59, portrait, janvier-mars, 1936 (received Oct. 1936.) ISIS

PART II

HISTORICAL CLASSIFICATION

I. — ANTIQUITY

1. — **ANTIQUITY** (*generalities*)

Artelt, Walter. Leibesübungen und Medizin in der Antike. 3 p. Sportmedizin und olympische Spiele, 1936. ISIS

Balss, Heinrich. Die Zeugungslehre und Embryologie in der Antike.

Eine Übersicht. *Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin* 5, 1-82, 1936. ISIS

Drachmann, A.G. Ancient oil mills and presses. 181 p. (*Det Kgl. Danske Videnskabernes Selskab. Archaeologisk-kunsthistoriske Meddelelser.* I, 1). Copenhagen, LEVIN & MUNKSGAARD, 1932. ISIS

Elaborate study based not only on the existent literature but on all the archaeological evidence, which is clearly discussed and represented by excellent photographs and drawings. In the course of his researches the author was made to realize that the eighteenth century writers were, within their limits, far better informed than most of the later ones. (I have more than once reached similar conclusions). G. S.

Forbes, R.J. The nomenclature of bitumen petroleum tar and allied products in antiquity. *Mnemosynes bibliothecae classicae batavae* 4, 67-77, 1936. ISIS

Gerlach, Hans. Die Kenntnisse der alten Kulturvölker von den gesunden und kranken Sinnesorganen auf Grund ihrer Anschauungen von der Heilkunde. *Archiv für Geschichte der Medizin* 29, 271-88, 1936. ISIS

Hähnel, Ruth. Der künstliche Abortus im Altertum. *Archiv für Geschichte der Medezin* 29, 224-55, 1936. ISIS

Partington, J.R. The discovery of bronze. *Scientia*, 197-204, octobre 1936. ISIS

"The alloy bronze, containing copper and tin, was probably made by melting together the separate metals. It was in use in a very ancient period in Egypt and in Mesopotamia. Recent discoveries at Ur seem to indicate that bronze rich in tin was in use by the Sumerians before the Egyptians, but its use diminished after the very early period, when the alloy was replaced by one of copper with lead and antimony. Linguistic and pictorial evidence suggests that the Egyptians and Sumerians, unlike the Jews, Greeks and Romans, had separate names for copper and bronze, and that they also had names for the metal tin. Possible sources for the copper and tin of ancient bronzes are considered. The source of the tin in the period 3500 B. C. is a difficult problem, but the most probable hypothesis is that the tin was obtained in Drangiana, in Iran (Persia), and it is possible, in view of the similarity between the Sumerian civilisation and that of Mohenjo-daro in the Indus Valley, that the invention of bronze itself was made in this region in Iran, where the Sumerians became acquainted with it in their migrations to Mesopotamia, and through them knowledge of bronze spread to the rest of the ancient world".

2. — EGYPT

Collart, Paul. A l'école avec les petits grecs d'Egypte. *Chronique d'Egypte* 11, 489-507, 1936. ISIS

Gardiner, Alan H. The library of A. CHESTER BEATTY. Description of a hieratic papyrus with a mythological story, love-songs, and other miscellaneous texts. 45 p., 61 plates by EMERY WALKER (The Chester Beatty papyri, no. 1). London, Oxford University Press, 1931. ISIS

Reviewed by GEORGE SARTON, *Isis* 25, 476-78, 1936.

Gardiner, Alan H. Hieratic papyri in the British Museum. Third series. 2 vols. (one quarto, the other folio). xiii+142 p.; 72 pl. London, British Museum 1935. ISIS

Reviewed by GEORGE SARTON, *Isis* 25, 476-78, 1936.

Grapow, Hermann. Untersuchungen über die altägyptischen medizinischen papyri. II. Teil. 138 p. (*Mitteilungen der vorderasiatisch-aegyptischen Gesellschaft*, 41.). Leipzig, HINRICHS, 1936. ISIS

Inhalt : Die Diagnosen; Die Rezepte; Die Zaubersprüche; Sprache und Alter der medizinischen Texte; Neuordnung der medizinischen Texte; Nachwort.

Hawkes, Christopher. Early iron in Egypt. *Antiquity* 10, 355-57, 1936. ISIS

Lefebvre, Gustave. Sur l'origine de la langue égyptienne. *Chronique d'Egypte* 11, 266-92, 1936. ISIS

Netolitzky, Fritz. Abnorme Kotbildung (" Schafkotform ") in einer altägyptischen Mumie. *Archiv für Geschichte der Medizin* 29, 348-49, 2 fig., 1936. ISIS

Pfister, R. Matériaux pour servir au classement des textiles égyptiens postérieurs à la conquête arabe. *Revue des arts asiatiques* 10, 1-16, 3 pl.; 73-85, 5 pl., Paris, Les éditions d'art et d'histoire, 1936. ISIS

" A partir de la conquête arabe on rencontre certaines matières, le lac-dye, le mang-koudou, le coton, sans parler de la soie, matières qui, pour des raisons diverses, n'avaient pas été utilisées auparavant et dont la présence permet de constituer des groupes homogènes postérieurs à la conquête. La plus couramment employée de ces matières est le lac-dye qui a remplacé le kermès,

introuvable à la suite de la fermeture de la Méditerranée; l'emploi du lac-dye a pris tout de suite une importance que le kermès n'avait jamais connue. La garance qui après la conquête comme avant, reste le colorant populaire, n'est plus guère utilisée pour être associée aux autres teintes lorsqu'il s'agit d'établir l'harmonie d'un gobelin." " Le lac-dye aussi bien que le mang-koudou viennent de l'Inde. Le fait que les Romains de même que leurs successeurs, les Byzantins, n'ont eu avec l'Inde que des rapports limités, a été démontré d'une façon originale par R. SEWELL." " Le fait que même jusqu'au X^me^ siècle les pays du Nord, Byzance et Perse n'ont pas utilisé le lac-dye ressort du reste de l'examen que nous avons pu faire des précieux tissus de soie provenant du Trésor de Sancta Sanctorum et conservés à la Bibliothèque Vaticane. Dans ces tissus nous n'avons pu rencontrer que la garance pour les chaines (cachées), kermès et cochenille polonaise pour les trames. On n'avait aucune raison de remplacer par du lac-dye exotique les colorants excellents et relativement abondants qu'on avait sous la main. Cette situation avait existé aussi pour l'Egypte, mais elle a changé totalement avec la conquête arabe."

Pogo, Alexander. Egyptian water clocks. *Isis* 25, 403-25, 4 pl., 6 fig., 1936. ISIS

" Reconstruction of a prismatic prototype of cylindrical inflow clocks. Operating with the simplest fractions, 1/2 and 1/3, and drawing straight lines only, we may construct a prismatic diagram which accounts for the unusual features of the cylindrical diagram of the Edfu inflow clock. The new diagram points to an Egyptian — not Greek — origin of several passages of classical literature dealing with the rate of increase of the length of the day. Reproduction and discussion of hitherto unpublished items connected with water clocks, such as the prismatic model in the Metropolitan Museum (Acc. No. 86.1.93) and the Medinet Habu astronomical ceiling. It is shown that the decanalogue of the Karnak outflow clock is closer related to the Senmut decanalogue than to those of the Ramesseum and of Medinet Habu."

Pogo, Alexander. Les trois calendriers inédits d'Assiout d'après un article récent d'ALEXANDRE POGO. Traduction de CH. FIÉVÉZ *Chronique d'Egypte* 11, 345-67, 10 pl., 3 fig., 1936. ISIS

Ranke, Hermann. Les noms propres égyptiens. *Chronique d'Egypte* 11, 293-323, 1936. ISIS

Sarton, George. On a curious subdivision of the Egyptian cubit. *Isis* 25, 399-402, 1936. ISIS

3. — BABYLONIA AND ASSYRIA

Desch, C.H. Seventh interim report of Committee appointed to report on the probable sources of the supply of copper used by the Sumerians. 3 p. British Association, Section H., Blackpool, 1936. ISIS

Gadd, C. J. The stones of Assyria. The surviving remains of Assyrian sculpture, their recovery and their original positions. xvii+252 p., 14 p., 47 pl., 2 plans. London, CHATTO and WINDUS, 1936. £ 3.3.0). ISIS

Contents : The first part, The recovery of sculptures. 1. First western visitors to Assyria : C. J. RICH : the traditions of the place : BOTTA and FLANDIN at Khorsabad; 2. LAYARD's first expedition, 1845-1847; 3. LAYARD's second expedition, 1849-1851; 4. An interregnum; V. Place at Khorsabad : H. RASSAM, 1852-1854; the Assyrian excavation fund; 5. LOFTUS and BOUTCHER, 1854-1855 : end of the decade of discovery. The second part, the surviving sculptures and their original positions.

Gandz, Solomon. The Babylonian tables of reciprocals. *Isis* 25, 426-32, 1936. ISIS

" In my paper, ' The sources of AL-KHOWARIZMI's Algebra', I referred to the Babylonian tables of reciprocals and suggested that they may be regarded as the origin of some minor mediaeval operations with reciprocals. On closer examination of the whole material, as now presented by O. NEUGEBAUER, I came to the conviction that there are no reciprocals in these tables and that it is, therefore, a misnomer to refer to them as Tables of Reciprocals." " We may thus learn to appreciate the legacy of Babylonia in the field of mathematics. Our ingenious modern system of decimal notation is distinguished by three fundamental features : the place value, the zero, and the decimal fractions. In principle, all of them were already contained in the sexagesimal notation of the ancient Babylonians. The third feature was re-invented by the Europeans. The first two features reached us by the way of the Hindus and Muslims. Were the Greeks and Romans entirely ignorant of these devices? This problem still awaits its solution."

Kugler, Franz Xaver (1862-1929). Sternkunde und Sterndienst in Babel. 3. Ergaenzungsheft zum ersten und zweiten Buch, von JOHANN SCHAUMBERGER. Mit 17 keilinschriftlichen Beilagen. v+152 p. paginated 243-394), 17 pl. Münster in Westfalen, Aschendorfschen Verlagsbuchhandlung, 1935. ISIS

Reviewed by SOLOMON GANDZ, *Isis* 25, 473-76, 1936.

Neugebauer, O. Jahreszeiten und Tageslängen in der babylonischen Astronomie. *Osiris* 2, pt. 12, 517-50, 8 fig., 1936. ISIS

" Die folgende Untersuchung betrifft eine sehr spezielle und ausserdem recht einfache Frage aus der babylonischen Astronomie, die auch schon von KUGLER in seiner ' Babylonischen Mondrechnung' ausführlich behandelt worden ist. Dass ich nochmals auf diese Dinge zurückkomme hat also nicht so sehr inhaltliche Gründe; es sind vielmehr *methodische* Gesichtspunkte die ich gerade an einem relativ einfachen Beispiel auseinandersetzen möchte. Damit ordnet sich diese Untersuchung aber als ein Glied in ein

sehr viel umfassenderes Arbeitsprogramm ein, dessen allgemeine Tendenz ich zunächst etwas näher formulieren will."

Pfeiffer, Robert H. Nuzi and the Hurrians. The excavations at Nuzi (Kirkuk, Iraq) and their contribution to our knowledge of the history of the Hurrians. Smithsonian Institution report, 535-58, 2 pl., Washington, D.C., 1935. ISIS

Thureau-Dangin, F. Notes sur la mathémathique babylonienne. *Revue d'assyriologie et d'archéologie orientale* 33, 180-84, 1936. ISIS

Contents : 1. Nouvelles observations sur YBC 4708; 2. BM 85200, n° XXI; 3. La notation numérique des mesures dans les textes mathématiques.

4. — GREECE

Drabkin, Israel E. An appraisal of Greek science. *Classical weekly* 30, 57-63, 1936. ISIS

Hopper, Grace Murray. The ungenerated seven as an index to Pythagorean number theory. *American mathematical monthly* 43, 409-14, 1936. ISIS

Luria, S. DARWINS Vorgänger in der Antike. *Archives for the history of science* 9, 129-50, 1936 (In Russian with German summary). ISIS

Ruska, J. Griechische Alchemie. *Geistige Arbeit*, 3, Nr. 15, p. 5, 1936. ISIS

Smith, David Eugene. Sir THOMAS LITTLE HEATH, *Osiris* 2, v—xxvii 1936. ISIS

Thompson, D'Arcy Wentworth. Astronomy in the classics. An address delivered to the Scottish classical association. 24 p., 3 ills. (no place, no price), 1936. ISIS

5. — ROME

Bologa, Valeriu L. Versuch einer medizinischen Auslegung der zwei Okulistenstempel aus Dacia Superior. Extras din " Anuarul Institutului de Studii Clasice " al Univ. Cluj 2, 219-22, 1933-35. (in Rumanian, with German summary). ISIS

" Der Verfasser versucht die wirksamen Substanzen der Stempel des T. ATTIUS DIVIXTUS und P. CORCOLONIUS zu identifizieren, ihre Pharma-

kodynamik zu bestimmen und ' ex iuvantibus ' auf die behandelten Augenleiden zu schliessen. Da 4 (oder sogar 5) von den 7 Rezepten sich auf das Trachom zu beziehen scheinen, kann man folgern, dass dieses Übel im trajanischen Dazien ziemlich haüfig war. (Vgl. auch des Verf. ähnliche Ausführungen über dieselben Stempel im *Bull. Soc. Française Hist. Méd.* Paris 1927, nr 1-2).

Igna, Nicolae. Le culte d'Esculape et de Hygie en Dacie Supérieure. 103 p., 35 fig. Universitatea " regele Ferdinand I," Cluj, Biblioteca medico-istorică, 1935 (in Rumanian with a French résumé). ISIS

Igna, Nicolae. Römische chirurgische Instrumente aus Apulum. Extras din " Anuarul Institutului de Studii clasice " al Univ. Cluj 2, 223-28, 2 fig., 1933-35 (in Rumanian with German summary). ISIS

" Der Verfasser beschreibt Instrumente aus Apulum (dem heutigen Alba-Iulia; ca. 106-271 p. Chr.) die sich im dortigen Museum und in anderen Sammlungen befinden, gefunden in den Jahren 1889-1909, 1911-13, 1919-1932 und 1936, im ganzen 37 Stück. Es handelt sich um Sonden, Nadeln, Messer, Löffel, Spateln und Pinzetten.

Sergieenko, M.E. Le conseil agrotechnique dans la littérature de l'économie rurale romaine. *Archives for the history of science* 9, 315-27, 1936 (in Russian with French summary). ISIS

II. — MIDDLE AGES

6. — **MIDDLE AGES** (*generalities*)

Birkenmajer, Aleksander. Pecja. 19 p. Kraków, 1936. IV. Zjazdowi bibljotekarzy polskich w Warszawie, Bibljoteka Jagiellónska. ISIS

Apropos of JEAN DESTREZ : *La pecia* (Paris 1935) analyzed in *Isis* by LYNN THORNDIKE (vol. 25, 155-57).

Brunn, W. v. Teufelsaustreibung — Zwangsjacke — Dämmerschlaf. Die pharmazeutische Industrie, Veröffentlichungen der Fachgruppe pharmazeutische Erzeugnisse der Wirtschaftsgruppe chemische Industrie, 2 p., 2 fig. (no date). ISIS

Nicholls, Albert G. The Secret of secrets as it appears in English literature. *Annals of medical history* 8, 404-26, 1936. ISIS

Ockenden, R.E. Answer to query no. 53. " Standing on the shoulders of giants " (*Isis* 24, 107-09). *Isis* 25, 451, 1936. ISIS

Riesman, David. Life in a medieval university. *Annals of medical history* 8, 395-403, 1936. ISIS

Schäfer, Karlheinrich. Die Heilkunde im märkischen Mittelalter. *Die medizinische Welt* no. 23, 24, 18 p., 1936. ISIS

Thorndike, Lynn. Query no. 62. JOANNES GAZULUS. *Isis* 25, 454, 1936. ISIS

Thorndike, Lynn. Some later medieval Latin medical MSS at Bern and Prag. *Annals of medical history* 8, 427-432, 1936. ISIS

7. — BYZANTIUM

Arendt, V.V. Das griechische Feuer (Salpetermischungen in der Feuerkampftechnik vor Auftreten der Feuerschusswaffe). *Archives for the history of science* 9, 151-204, 24 fig., 1936 (in Russian, with German summary). ISIS

III. — ORIENTAL SCIENCE AND CIVILIZATION

8. — EASTERN ASIA

(Including works relative to the whole of Buddhist Asia, or to India, Central and Eastern Asia combined)

Suzuki, Daisetz Teitaro. Manual of Zen Buddhism (The Ataka Buddhist library VIII). 232 p., pl., ills. Kyoto, Eastern Buddhist Society, 1935 (American agent : Boston, MARSHALL JONES) ($ 2.50). ISIS

After his *Introduction to Zen Buddhism* and the *Training of the Zen Monk*, Dr. SUZUKI's *Manual* is very significant. It contains various literary materials relating to the monastery life from Indian, Chinese and Japanese sources. S. S.

9. — INDIA

Aiyar. M.S. Ramaswami. The question of gramas. *Journal of the royal asiatic society* 629-40, 1936. ISIS

Concerning a problem of Hindu music. G. S.

Arkell, A.J. Cambay and the bead trade. *Antiquity* 10, 292-305, 4 pl., 1936. ISIS

Brunn, W. v. Neues über eine sehr alte Wohnungs- und Städtekultur in Indien. Technikgeschichte, *Beiträge zur Gesch. d. Technik u. Industrie* 25, 144-45, 2 pl., 1936. ISIS

Coomaraswamy, Ananda K. A note on the Aśvamedha. *Archiv Orientalni* 7, 306-17, 1936. ISIS

Datta, B.; Singh, A.N. History of Hindu mathematics. A source book. Part I, Numeral notation and arithmetic. xx+261 p. Lahore, Das, 1935. ISIS

Reviewed by Solomon Gandz, *Isis* 25, 478-88, 1936.

Edgerton, Franklin. Indirect suggestion in poetry : A Hindu theory of literary aesthetics. *Proceedings of the American philosophical society* 76, 687-706, 1936. ISIS

"One of the most prominent of the several Hindu schools of literary aesthetic theory is that known as the *dhvani* school. It teaches that all literary art of the first rank contains *dhvani* — "tone, resonance, reverberation" — which is something that is not directly said in words, but indirectly suggested; and this 'unsaid' meaning always (in first-class poetry) constitutes the prime source of aesthetic appeal. It is the purpose of the paper to outline the main points of the system as developed by the Hindus; to inquire whether and to what extent similar views have been expressed by western theorists; and to suggest that the doctrines of the *dhvani* school, with some modifications perhaps, could profitably be tried out by literary aestheticians of today."

Elliot, R.H. Indian conjuring. *Nature* 138, 425-27, 1936. ISIS

Filliozat, Jean. La médecine et la magie des santals. *Journal asiatique* 227, 277-84, 1935 (received Sept. 1936.) ISIS

Apropos of the Rev. P. O. Bodding's studies (Calcutta 1925-27). G. S.

Kempers, A.J. Bernet. Oogheelkunde in een indisch reliëf. *Bijdragen tot de geschiedenis der geneeskunde* 16, 140-42, 1 pl., 1936. ISIS

Ophtalmology in a Mathura bas relief, no. J.I. in J. Ph. Vogel : *Catalogue of the archaeological museum at Mathure* (1910, 141). G. S.

Lippmann, Edmund O. von. Zur Kenntnis der sog. Alchemie des alten Indiens. *Die Naturwissenschaften* 24, 766-67, 1936. ISIS

Mody, Ramniklal R. Indian astrology (Ashtottari & Vinshottari Dashas). vi+48 p. Bombay 2, M.N. Kulkarni, Chira Bazar, 1935 (Rs. 3, foreign 5 sh.). ISIS

" The idea of the present book is to explain the Indian astrological systems of directing as propounded in the Ashtottari and Vinshottari Dashas, two out of the 42 kinds mentioned by PĀRĀSHARA the famous author of the standard Indian astrological work the *Brihat Pārāshara Horā* which are most commonly in use at the present day."

Sarton, George. A Hindu decimal ruler of the third millennium. *Isis* 25, 323-26, 1936. ISIS

Apropos of a decimal ruler found at Mohenjo-daro with general considerations on that early civilization, which was entirely unknown before 1921. G. S.

10. — CHINA

Bernard, Henri (S.J.). Etudes sur l'humanisme chrétien en Chine à la fin des Ming. *Nankai social & economic quaterly* 9, 678-708, 1936. ISIS

Contents : III. En face du Bouddhisme chinois; Le Bouddhisme chinois vu à travers celui du Japon; Les premiers contacts avec le Bouddhisme proprement chinois; En marge de la société chinoise. IV. Nantch'ang, une ville de lettrés à la fin du XVI^{e} siècle; L'audience du vice-roi et ses suites inattendues; Quelques-uns des amis notables de RICCI; L'enseignement humaniste du P. RICCI.

Bernard, Henri (S.J.). Réponse à la question 50. Apropos de la soie d'araignée et des traductions chinoises (*Isis* 24, 103-06, 1935) *Isis* 25, 449-51, 1936. ISIS

Davis, Tenney L. The dualistic cosmogony of HUAI-NAN-TZŬ and its relations to the background of Chinese and of European alchemy. *Isis* 25, 327-40, 1936. ISIS

" While we do not find in the writings of WEI PO-YANG any clear-cut dualistic doctrine of chemistry we do find an account of the alchemical process based directly upon Yin-Yang. The ancient doctrine of the Two Contraries was evidently imported into China where a mystical idea-system gave practical people strong motives for seeking an immortality which was not promised by their religion. Here it seems to have furnished a general scientific background upon which alchemy sprang up, an alchemy identical in theory and practice with the later alchemy of mediaeval Europe. The facts confirm the opinion that alchemy came to Europe from China, probably through the agency of the Arabs in the eighth or ninth

century, and that it there mingled with the purely chemical tradition of Alexandria to make up the body of information and practice, knowledge and speculation, which was the alchemy and chemistry of mediaeval Europe."

Read, Bernard E. Chinese medicinal plants from the Pen Ts'ao Kang Mu A.D. 1596. 3rd edition of a botanical, chemical and pharmacological reference list. xvi+389 p. (*Peking natural history bulletin*, 1936). Peiping, French Bookstore, Grand Hôtel de Pékin. ISIS

Reviewed by T. A. H., *Nature* 138, 484, 1936.

Seligman, C.G.; Ritchie, P.D.; Beck, H.C. Early Chinese glass from pre-Han to T'ang times. *Nature* 138, p. 721, 1936. ISIS

12. — ISRAEL

(*Including works devoted to Palestine*)

Gandz, Solomon. Answer to query no. 46. "Sleeping along the meridian." (*Isis* 22, 1935, p. 525 ff.). *Isis* 25, 449, 1936. ISIS

Harris, H.H.; Harris, T.N. Pulmonary pathology in the Talmud. *Annals of medical history* 8, 553-57, 1936. ISIS

Sidersky, D. L'origine de l'ère juive de la création du monde. *Journal asiatique* 227, 325-29, 1935. (received Sept. 1936). ISIS

14. — ISLAM (*also Arabia*)

Ali, Zaki. La psychothérapie dans la médecine arabe. *Bull. de la soc. franç. d'hist. de la méd.* 34, 268-72, 1936. ISIS

Brunschvig, Robert. Mesures de capacité de la Tunisie médiévale. *Revue africaine*, nos. 364-65, 11 p., 1935. ISIS

En plus des indications données par l'Espagnol AL-BAKRÎ et le Syro-Egyptien IBN FAḌLALLAH AL-'UMARÎ, l'auteur a consulté celles données dans "les textes de nature juridique, commentaires de ḥadîṯs, traités de fiqh, recueils de fatwâs. S'agissant de mesures, de poids, de monnaies, le chapitre de la dîme aumônière (zakât) est toujours à y consulter, car la nécessité de déterminer le minimum imposable (niṣâb) oblige les auteurs à donner l'équivalence du système local avec celui 'du Prophète' ou système 'légal (šar'î).' Quelques recherches dans les œuvres des juristes tunisiens des XIV^e^ et XV^e^ siècles permettent par exemple d'éclairer d'un jour nouveau la question qui nous occupe, celle des mesures de capacité dans l'Ifrîqiya des derniers siècles du moyen âge." G. S.

Canaan, T. Arabic magic bowls. *Journal of the Palestine oriental society* 16, 79-127, 2 pl., 9 fig., 1936. ISIS

Chol, Ismâ'îl Beg. The Yazîdîs, past and present. Being three original texts about Yazîdî doctrines, customs, and some events of their history, with an autobiography of one of their contemporary Amîrs. Ed. by COSTI K. ZURAYK. vii+134 p. (American University of Beirut, publications of the Faculty of arts and sciences, oriental series, no. 6). Beirut, American Press, 1934. ISIS

Reviewed by P. KRAUS, *OLZ* 39, 618, 1936.

Glueck, Nelson. Christian Kilwa. *Journal of the Palestine oriental society* 16, 9-16, 1 pl., 3 fig., 1936. ISIS

Haddad, Sami I. Arab contribution to the medical sciences. First edition illustrated. 79 p. Imp. Rihani, Beirût, 1936 (in Arabic). ISIS

Khairallah, Amin A.; Haddad, Sami I. A study of Arab hospitals in the light of present day standardization. *Bulletin, American college of surgeons*, 5 p., 1936. ISIS

Pigulevskaia, N. Littérature alchimique syriaque au moyen âge. *Archives for the history of science* 9, 329-42, 1936 (in Russian with French summary). ISIS

" La littérature scientifique syriaque au moyen âge avait précédé et profondément influencé le développement des sciences chez les arabes. La chimie appliquée dans son aspect primitif est connue par les syriens et les sabéens de Harran dès les temps les plus anciens. La connaissance des propriétés naturelles des plantes, la préparation des poisons et des remèdes est dûe à la médecine syriaque. Ces graines furent développées en iatrochimie par les docteurs médiévals arabes et latins. Les traités alchimiques syriaques contiennent une quantité de recettes techniques, qui démontrent une assimilation de procédés de métallurgie et l'application des qualités diverses des minéraux. En partie ces recettes sont de provention syriaque et leur caractère spécial est dû au développement des métiers en Syrie et Mésopotamie. Elles sortent directement des ateliers, comme un résultat de la pratique des artisans, pour servir, comme indication et avis aux autres. Le commerce syrien, étant une force considérable au moyen âge en Europe (jusqu'au VII siècle) ainsi qu'en Asie (jusqu'au XIII siècle), se servait en grande partie par les marchandises fabriqués dans les villes de leur pays natal. Le renseignement précieux du traité alchimique syriaque se rapporte au moment quand la science secrète hermétique en Egypte fut arrachée des mains des sacerdoces par les artisans. Les recettes pour la teinture des tissus, de la laine, l'invention du feu grec ont un but pratique. Les indica-

tions souvent vagues et indistinctes, pour la falsification de l'or et de l'argent par la coloration artificielle d'autres métaux et la ' diplosis ' proviennent des ateliers d'orfèvrerie, pour servir aux intentions pratiques et techniques, comme le prouvent les sources syriaques. Dans le laboratoire secret de l'alchimiste des recettes deviennent des procédés de l'alchimie vulgaire."

Renaud, H.P.J. Note sur les noms des vents chez les indigènes du Maroc occidental. Mémoire annuel consacré à la physique du globe et à la météorologie au Maroc pour l'année 1933, no. 41 des Mémoires de la Société des sciences naturelles du Maroc (15 septembre 1935). ISIS

Salameh, Omar (1901-). Untersuchungen zur "Capsula eburnea" und dem Urinbuch des MAGNUS VON EMESA in der arabischen Tradition. 25 p. (Diss., Institut für Geschichte der Medizin an der Universität Leipzig). Leipzig 1932. ISIS

With regard to the first subject the author concludes " In Alexandrien wahrscheinlich von PALADIOS in griechischer Sprache im 6. Jahrhundert n. Chr. entstanden, bekommt die ' Capsula eburnea ' die erste lateinische Fassung zwischen dem 6. und 8. Jahrhundert. Aus dem Griechischen im 9. Jahrhundert wird die ' Capsula eburnea ' von ḤUNAIN IBN IṢḤAḲ ins Arabische übersetz. Aus dieser arabischen Fassung erfährt die ' Capsula eburnea ' später ihre hebräische Übersetzung. Die mir vorliegende zweite arabische Fassung ist erweitert, entweder ist sie einem anderen griechischen Text entnommen, oder durch andere Ärzte kurz nach ḤUNAIN entstanden. Aus der zweiten arabischen Fassung ist wahrscheinlich die zweite lateinische Übersetzung von GERHARD VON CREMONA kurz nach 1170 entstanden *(Intr.* 2, 342).

As to the treatise on urine ascribed to GALEN, but more probably written by MAGNOS OF EMESA (about the fifth cent., *Intr.* 2, 75), the author gives a partial German version translation of a text by MAGNUS AL-ḤIMṢĪ translated into Arabic by one AḤMAD IBN ABI BAKR IBN AL-FAWARIS IBN MANQID, in Nov. 1298. G. S.

PART III

SYSTEMATIC CLASSIFICATION

I. — SCIENCE IN GENERAL

16. — HISTORY OF SCIENCE

Annals of science. A quarterly review of the history of science since the Renaissance. Editors : D. MCKIE, HARCOURT BROWN, and H. W. ROBINSON. Vol. I, January 15, 1936, no. 1, 113 p., 11 pl. London, E. C. 4, TAYLOR and FRANCIS, Red Lion Court, Fleet St. (annual subscription £ 1). ISIS

Reviewed by G. S., *Isis* 25, 488, 1936 and by A. POGO, *Astrophysical journal* 83, 256, 1936.

Bilancioni, Guglielmo. Sulle rive del Lete : rievocazioni e ricorsi del pensiero scientifico italiano. 346 p. Rome, BARDI, 1930. ISIS

Birkenmajer, Alexandre; Dickstein, Samuel. Coup d'œil sur l'histoire des sciences exactes en Pologne. Histoire sommaire des sciences en Pologne, publiée à l'occasion du VII[e] congrès international des sciences historiques, 32 p., 1933. ISIS

Bouligand, Georges; Brunold, Ch.; Grumbach, A.; Morand, M.; Sergescu, P.; Taboury, M.; Turpain, A. L'évolution des sciences physiques et mathématiques. 267 p. (Bibliothèque de philosophie scientifique). Paris, FLAMMARION, 1935. ISIS

Brunet, Pierre. L'école lyonnaise d'histoire des sciences (A. HANNEQUIN, E. GOBLOT, A. GEORGES-BERTHIER). *Archeion* 18, 146-59, 1936. ISIS

Crommelin, C. A. Ansprache bei der Eröffnung des Niederländischen Museums zur Geschichte der Naturwissenschaften zu Leiden (Gehalten am 5. Juni 1931). Übers. von M. v. ROHR. *Die Naturwiss.*, 19, 673-75, 1931. ISIS

Drachman, Julian M. Studies in the literature of natural science. xi+487 p., 6 pl. New York, MACMILLAN, 1930. ISIS

Reviewed by T. G., *Nature* 129, 263, 1932.

Duhem, Hélène Pierre. Un savant français, PIERRE DUHEM. Préface de MAURICE D'OCAGNE. 240 p., port. Paris, PLON, 1936 (15 fr.). ISIS

Voici la seconde biographie du regretté P. DUHEM (1861-1916) à paraître en quelques années. Celle de PIERRE HUMBERT parut en 1932 (*Isis* 21, 399). Celle-ci écrite par l'enfant unique de DUHEM est meilleure que la première et contient quelques excellents morceaux, tels que le témoignage d'ANDRÉ CHEVRILLON (p. 55-78) et l'admirable lettre que DUHEM écrivit en 1911 au Père BULLIOT (p. 158-69). Malheureusement ce n'est pas encore une vraie biographie, mais plutôt un panégyrique. L'auteur parle souvent de charité chrétienne, mais oublie parfois de la pratiquer, et son livre contient trop de fiel, et révèle trop de rancœur pour être tout à fait aimable. C'est bien dommage, et DUHEM mérite mieux que cela: une vraie biographie critique. Les réflexions de DUHEM sur la science et l'industrie (p. 228) me paraissent un peu étroites; il faudrait les corriger en les comparant à celles de HENRI LE CHÂTELIER (1850-1936) dans son dernier livre : *De la méthode dans les sciences expérimentales* (Paris 1936) dont nous reparlerons plus tard. G. S.

Dustin, A. Le courage scientifique. *Revue de l'Université de Bruxelles* 42, 21-47, 1936-37. ISIS

On trouvera, vers la fin de ce discours, qui analyse les différentes formes du courage en science, des exemples empruntés principalement à l'histoire de la médecine aux XIX^e^ et XX^e^ siècles. J. P.

Gunther, Robert Theodore. The Old Ashmolean, the oldest museum for the history of the natural sciences and medicine. Prepared for the 250th anniversary of the opening of the museum. iv+151 p. Oxford, Old Ashmolean, 1933. ISIS

Histoire sommaire des sciences en Pologne, publiée à l'occasion du VII^e^ Congrès international des sciences historiques. 155 p. Cracow, Drukarnia Narodowa, 1933. ISIS

Janet, Paul. Notes et souvenirs. 342 p., pl, Paris, GAUTHIER-VILLARS, 1933. ISIS

Jones, B. Mouat. The scientist and the historian : a plea for cooperation. *Memoirs and proceedings of the Manchester literary and philosophical society*, 76, 19-30, 1931-32. ISIS

Meyer, Adolf. Über historische Kontinuität und Epochenunabhängigkeit. Eine Antwort an Herrn ALDO MIELI. *Archiv für Geschichte der Medizin* 29, 196-202, 1936. ISIS

Mieli, Aldo. Un viaggio in România. *Archeion* 18, 191-203, 1936. ISIS

Osiris, Vol. I. Edited by GEORGE SARTON with the co-operation of R. C. ARCHIBALD, B. M. FRICK, and A. POGO. 777 p. Bruges, St. Catherine Press, 1936. ($ 6.00). ISIS

Reviewed in the *Astrophysical journal*, July, 1936; and by G. L., *Boll. d. Mat., sezione storico anno* 32, xli-xliii, 1936.

Osiris, volume II. Edited by GEORGE SARTON, with the co-operation of A. POGO. xxviii+550 p., 13 pl., 13 fig. Bruges, St. Catherine Press, 1936 ($ 6.00.; $ 5 to members of H. S. S.). ISIS

This volume is dedicated to Sir THOMAS HEATH, historian of Greek mathematics and astronomy, contains a biography and bibliography of the latter as well as a beautiful portrait. It includes eleven other memoirs which are duly registered in *Isis* each in its proper place.

Petrucci, Gino Bargagli. L'Italia e la scienza. Studi di vari autori. viii+400 p. Firenze, LE MONNIER, 1932. ISIS

Reviewed by ALDO MIELI, *Archeion*, 15, 261-66, 1933.

Pina, Luiz de. O ensino da história das ciências, em especial da medicina. *Anais da faculdade de ciências do Porto* 18, 42 p., 1934. ISIS

Pina, Luiz de. Os homens da Igreja na ciência nacional. *Revista « Brotéria »* 23, 23 p., 1936. ISIS

Sarton, George. The history of science and the new humanism. 178 p. New York, HOLT, 1931. ISIS

Reviewed by J. N., *Lychnos* 1, 331-34, 1936 (in Swedish); an in T. RAINOV's paper, *History of science in the works of George Sarton* (in Russian). Socialist reconstruction and science no. 9/10, 138-48, 1932; by Q. VETTER, *Příroda* 25, 1-2 (in Czech).

Sarton, George. Forty-sixth critical bibliography of the history and philosophy of science and of the history of civilization (to end of February 1936, — with special reference to China and Japan). *Isis* 25, 522-613, 1936. ISIS

" This forty-sixth Bibliography contains about 525 items of which 105 deal with China and Japan. They have been kindly contributed by seven scholars belonging to 3 different countries."

Sarton, George. The study of the history of science. v+75 p. Cambridge, Mass., Harvard University Press, 1936. ISIS

Reviewed by R. C. BENEDICT, *The teaching biologist*, 6, 61, 1937; by F.S. BODENHEIMER, *Journal ha-erez* of Jerusalem, October 9, 1936 (in Hebrew); by VICTOR MARIAN, *Clujul medical* 17, 710, 1936; by J. PELSENEER, *Revue de l'Université de Bruxelles* 42, 24-30, 1936-37; by A. POGO, *Popular astronomy* 44, 464, 1936; by Sir THOMAS L. HEATH, *Nature* 138, 700-01, 1936; by Q. VETTER, *Příroda* 29, 314.

Savorgnan di Brazzà, Francesco. Da LEONARDO a MARCONI; invenzioni e scoperte italiane. vii+368 p., 48 pl., ill. Milan, HOEPLI, 1933. ISIS

Reviewed by GINO TESTI, *Archeion* 15, 268, 1933.

Schmidt, Franz. Die Theorie der Geisteswissenschaften vom Altertum bis zur Gegenwart. 150 p. München, REINHARDT, 1931. ISIS

Wightman, William Persehouse Delisle. Science and monism.

Foreword by Sir PERCY NUNN. 416 p. (History of science library). Londen, ALLEN and UNWIN, 1934. ISIS

Reviewed in *Nature* 135, 388, 1935.

17. — ORGANIZATION OF SCIENCE

(International organization is meant, see Isis 1, 195. *For external organization, national, or international, see section* 55).

Crowther, J. G. Science in Soviet Russia. 128 p., 13 pl. London, WILLIAMS and NORGATE, 1930. ISIS

Crowther, J. G. Soviet science. x+342 p., 16 pl. London, KEGAN PAUL, 1936. ISIS

Reviewed by E. J. RUSSELL, *Nature* 137, 797-98, 1936.

Hall, Sir **Daniel and others**. The frustration of science. Foreword by FREDERICK SODDY. 144 p. London, ALLEN and UNWIN, 1935. ISIS

Reviewed by R. B., *Nature* 135, 414-15, 1935.

Huxley, Julian S. Scientific research and social needs. With an introductory chapter by Sir WILLIAM BRAGG, and discussions with H. LEVY, Sir THOMAS D. BARLOW and P. M. S. BLACKETT. xvi+287 p., 40 pl. (The Library of science and culture). London, WATTS, 1934. ISIS

Reviewed by J. W. W., *Nature* 134, 83-84, 1934.

Jeans, James; **Bragg, William** (and others). Scientific progress. London, ALLEN and UNWIN, 1936. ISIS

The Halley Stewart lectures for 1935.

La Vaissière, Jules de. Méthodologie scientifique; méthodologie, dynamique, interne. *Archives de philosophie* 10, 2+109 p. Paris, BEAUCHESNE, 1933. ISIS

Reviewed by R. P., *Revue générale des sciences* 46, 96, 1935.

Ramón y Cajal, Santiago. Regeln und Ratschäge zur wissenschaftlichen Forschung. Ins Deutsche übers. v. D. MISKOLZCY, 134 p. München, REINHARDT, 1933. ISIS

Richardson, Ernest Cushing. Classification, theoretical and practical. 3rd. ed. xvi+228 p. New York, WILSON, 1930. ISIS

Robertson, Thorburn Brailsford (1884-1930). The spirit of research. Edited by JANE W. RORERTSON. xiv+210 p., 2 pl. Adelaïde, PREECE, 1931. ISIS

Reviewed by E. F. A., *Nature* 131, 111-12, 1933.

Science. L'Encyclopédie annuelle. Journal hebdomadaire édité par le Centre international de synthèse. Fondation « Pour la Science ». Directeur : HENRY BERR. Directeurs des sections : LUCIEN FEBVRE, PAUL LANGEVIN, ALDO MIELI, ABEL REY. 12 rue Colbert (2e) Paris. Numéro 1, Octobre 1936, 8 pages. France : 45 fr. par an. Etranger 60 à 120 fr. par an in folio. ISIS

" ' Science ' aura deux ' feuilletons ' par numéro, 104 dans l'année. Ces 104 feuilletons — 52 consacrés aux sciences de la Nature, 52 consacrés aux sciences de l'Humanité — présenteront au public sous forme précise et claire les grands problèmes, les grands résultats de *toutes les sciences*. Ils constitueront l'inventaire scientifique de l'année. Un plan très étudié donnera à chaque feuilleton, par un numéro d'ordre, sa place dans la classification des sciences. Les feuilletons seront détachables suivant un pointillé. Replacés dans l'ordre logique, réunis sous couverture mobile ou reliés, ils formeront, en fin d'année, un volume de plus de 400 pages, l' *Encyclopédie annuelle*. Ainsi se trouvera réalisée pour les lecteurs de *Science* une Encyclopédie mouvante, vivante, toujours renouvelée, toujours actuelle."

Science and Society, a Marxian quarterly. Vol. 1, no. 1, 126 p. Cambridge, Mass. 6½ Holyoke St., 1936. ISIS

We welcome this new periodical the purpose of which is sufficiently indicated by the title. This first number contains among other things an article on mathematics by the distinguished Dutch-American professor D. J. STRUIK and a note on COMTE by BERNHARD J. STERN. G. S.

Stamp, Sir **Josiah**. The impact of science upon society. *Science* 84, 236-39, 1936; also in *Nature* 138, 435-48, 1936. ISIS

Concluding part of the address of the president of the British Association for the Advancement of Science, Blackpool, September 9, 1936. " What we have learned concerning the proper impact of science upon society in the past century is trifling, compared with what we have yet to discover and apply. We have spent much and long upon the science of matter, and the greater our success the greater must be our failure, unless we turn also at long last to an equal advance in the science of man."

18. — PHILOSOPHY OF SCIENCE

Auerbach, Felix. Das naturwissenschaftliche Weltbild. 135 p. Berlin-Lichterfeld, BERMÜLLER, 1933. ISIS

Barnes, Ernest William. Scientific theory and religion : the world described by science and its spiritual interpretation. xxiv+685 p. (The Gifford lectures at Aberdeen 1927-1929). Cambridge, University Press, 1933. ISIS

Barthel, Ernst. Die Welt als Spannung und Rythmus. Erkenntnistheorie, Ästhetik, Naturphilosophie, Ethik. xviii+411 p. Leipzig, NOSKE, 1932. ISIS

Bavink, Bernhard. The anatomy of modern science : an introduction to the scientific philosophy of to-day. Translated from the fourth German edition, with additional notes and bibliography for English readers, by H. STAFFORD HATFIELD. xiii+683 p. London, BELL, 1932. ISIS

Reviewed by R. B., *Nature* 131, 707-08, 1933.

Bavink, Bernhard. Ergebnisse und Probleme der Naturwissenschaften. (Eine Einführung in die heutige Naturphilosophie). 5. neubearb. und erweit. Aufl. ix+650 p., 89 fig., 1 pl., port. Leipzig, HIRZEL, 1933. ISIS

Bell, Eric Temple. The search for truth. x+279 p. Baltimore, WILLIAMS and WILKINS, 1934. ISIS

Reviewed by OLIVER L. REISER, *Philosophy of science* 2, 118-20, 1935.

Boas, George. A critical analysis of the philosophy of EMILE MEYERSON. 146 p. Baltimore, JOHNS HOPKINS, 1930. ISIS

Bridgman, Percy Williams. The nature of physical theory. 138 p. Princeton University Press, 1936. ISIS

Reviewed by WILLIAM MARIAS MALISOFF, *Philosophy of science* 3, 360-64, 1936.

Bridgman, Percy Williams. Die Logik der heutigen Physik, mit einer Einführung von H. DINGLER; deutsche Übersetzung von W. KRAMPF. 168 p. München, HUEBER, 1932. ISIS

Reviewed by E. O. VON LIPPMANN, *Chemiker-Zeitung*, 56, p. 875, 1932.

Eddington, Sir **Arthur Stanley**. New pathways in science. x+333 p., 4 pl. (Messenger lectures, 1934). Cambridge, University Press, 1935. ISIS

Reviewed by HERBERT DINGLER, *Nature* 135, 451-54, 1935.

Engels, Friedrich. Dialektik der Natur. Hrsg. von D. RJAZANOV. *Marx-Engels Archiv* II, 117-395, Frankfurt a. M., 1927. ISIS

Reviewed by DIRK JAN STRUIK, *Philosophy of science* 1, 122-23, 1934.

Frank, Philipp. Das Kausalgesetz und seine Grenzen. xv+308 p., 4 fig. (Schriften z. wissenschaftl. Weltauffassung, 6). Wien, SPRINGER, 1932. ISIS

Friend, Julius Weis; Feibleman, James. Science and the spirit of man : a new ordering of experience. 336 p. London, ALLEN and UNWIN, 1933. ISIS

Reviewed by W. G. L. C., *Nature* 134, 233-34, 1934.

George, William Henry. The scientist in action : a scientific study of his methods. 355 p. London, WILLIAMS and NORGATE, 1936. ISIS

Reviewed by NORMAN R. CAMPBELL, *Nature* 138, 381-82, 1936.

Haas, Arthur. Die kosmologischen Probleme der Physik. vii+124 p. Leipzig, Akademische Verlagsgesellschaft, 1934. ISIS

Reviewed in *Nature* 134, 125, 1934.

Heisenberg, Werner. Wandlungen in den Grundlagen der Naturwissenschaft. Zwei Vorträge. 45 p. Leipzig, HIRZEL, 1935. ISIS

Reviewed by T. G., *Nature* 136, 322, 1935.

Heyl, Paul, R. The philosophy of a scientific man. 182 p. New York, Vanguard Press, 1933. ISIS

Hönigswald, Richard. Kausalität und Physik. Eine methodologische Überlegung. *Sitz.-Ber. Preuss. Akad. Wiss.*, Phys.-math. Kl., 568-78, 1933. ISIS

Jeffreys, Harold. Scientific inference. vii+247 p. Cambridge, University Press, 1931. ISIS

Joad, Cyril Edwin Mitchinson. Philosophical aspects of modern science. 344 p. London, ALLEN and UNWIN, 1932. ISIS

Reviewed in *Nature* 130, 487-89, 1932.

Langdon-Davies, John. Science and common sense. 284 p. London, HAMILTON, 1931. ISIS

Lindsay, Robert Bruce; Margenau, Henry. Foundations of physics. xiii+537 p. London, WILEY and Sons, 1936. ISIS

Reviewed by WILLIAM MARIAS MALISOFF, *Philosophy of science* 3, 371-72, 1936.

Lodge, Sir **Oliver**. My philosophy, representing my views on the many functions of the ether of space, 318 p. London, BENN, 1933. ISIS

(Marvin, Francis Sidney). The new world-order. Essays arranged and edited by F. S. MARVIN. vi + 188 p. (Unity series, 9). Oxford, University Press, 1932. ISIS

Reviewed by E. J. H., *Nature* 130, 76-77, 1932.

Millikan, Robert Andrews. Time, matter and values. x+99 p., 10 pl. (John Calvin McNair lectures). Chapel Hill, N. C., University of North Carolina Press, 1932 ISIS

Parodi, D. Le cheminement de la pensée selon M. EMILE MEYERSON. *R. de métaphysique et de morale* 39, 387-415, 1932. ISIS

Voir *Isis* 17, 444-45, 1932.

Planck, Max. Where is science going? Translated and edited by JAMES MURPHY. 234 p. London, ALLEN and UNWIN, 1933. ISIS

Reviewed by THOMAS GREENWOOD, *Nature* 132, 947-48, 1933.

Reichenbach, Hans. Atom and cosmos : the world of modern physics. Translated and revised by EDWARD S. ALLEN. 300 p. New York, MACMILLAN, 1933. ISIS

Reviewed by CASSIUS JACKSON KEYSER, *Scripta mathematica* 1, 327-41, 1933.

Reichenbach, Hans. La philosophie scientifique, vues nouvelles sur les buts et les méthodes. Traduction de ERNEST VOUILLEMIN, revue et mise à jour par l'auteur. Introduction de MARCEL BOLL. 44 p. Paris, HERMANN, 1932. ISIS

Edit. allemande : Ziele und Wege der heutigen Naturphilosophie, (F. MEINER, Leipzig, 1931).

Reiser, Oliver Leslie. Philosophy and the concepts of modern science. xviii+315 p. New York, MACMILLAN, 1935. ISIS

Reviewed by DAVID LINDSAY WATSON, *Philosophy of science* 3, 364-65, 1936.

Renaud, Paul. Structure de la pensée et définitions expérimentales. 24 p. (Exposés de philosophie des sciences, II). Paris, HERMANN, 1934. ISIS

Reviewed by G. P., *Revue générale des sciences* 46, 216, 1935.

Robertson, Thorburn Brailsford. The spirit of research. Edited by JANE W. ROBERTSON. Introduction by S. W. PENNYCUICK. xi+210 p. Adelaide, FREECE, 1931. ISIS

Schaar, B. E. Scientific method and social relations. *Science* 76, 551-57, 1932. ISIS

Schrödinger, Erwin. Über Indeterminismus in der Physik. Ist die Naturwissenschaft milieubedingt? Zwei Vorträge zur Kritik der naturwissenschaftlichen Erkenntnis. 62 p., 5 fig. Leipzig, BARTH, 1932. ISIS

Schrödinger, Erwin. Science and the human temperament. Translated, and with a biographical introduction, by JAMES MURPHY and W. H. JOHNSTON. xiv+192 p. London, ALLEN and UNWIN, 1935. ISIS

Reviewed by A. D. R., *Nature* 136, 354, 1935.

Sée, Henri. Science et philosophie d'après la doctrine d'EMILE MEYERSON. 203 p. Paris, ALCAN, 1932. ISIS

Reviewed by HÉLÈNE METZGER, *Archeion* 15, 143, 1933.

Sheen, Fulton. J. Philosophy of science. xxv+197 p. Milwaukee, BRUCE, 1934. ISIS

Reviewed by W. M. MALISOFF, *Philosophy of science* 2, 381-83, 1935.

Silberstein, Ludwik. Causality : a law of nature or a maxim of the naturalist? Lecture delivered at the Royal York Hotel, Toronto, on May 14th, 1932, much enlarged. viii+159 p. London, MACMILLAN, 1933. ISIS

Reviewed in *Nature* 133, 235, 1934.

Sullivan, John William Navin. Limitations of science. v+303 p. London, CHATTO and WINDUS, 1933. ISIS

Reviewed by F. S. MARVIN, *Nature* 132, 872-73, 1933.

Tolman, Richard Chace. Relativity, thermodynamics and cosmology. xv+502 p. (International series of monographs on physics). Oxford, Clarendon Press, 1934. ISIS

Reviewed by ENOS E. WITMER, *Philosophy of science* 2, 262-65, 1935.

Wells, Herbert George. What are we to do with our lives? vi+148 p. New York, DOUBLEDAY, DORAN, 1931. ISIS

Reviewed by L. A. F., *Nature* 129, 415-17, 1932.

Wenzl, Aloys. Wissenschaft und Weltanschauung. Natur und Geist als Probleme der Metaphysik. xi+374 p. Leipzig, MEINER, 1936. ISIS

Whitehead, Alfred North. Adventures of ideas. xii+392 p. New York, MACMILLAN, 1933. ISIS

Reviewed by SARAH YOUNGMAN KEYSER, *Scripta mathematica* 2, 59-63, 1933.

Worrall, Ralph Lyndal. The outlook of science : modern materialism. v+203 p. London, BALE, Sons and DANIELSSON, 1933. ISIS

II. — FORMAL SCIENCES (*Knowledge of forms*)

19. — LOGIC AND THEORY OF KNOWLEDGE

Boll, Marcel, La logique et sa caricature. 49 p. Paris, RIEDER, 1935. ISIS

Reviewed by HARRY MALISOFF, *Philosophy of science* 3, 130, 1936.

Carnap, Rudolf. L'ancienne et la nouvelle logique. Traduction du Général ERNEST VOUILLEMIN, revue et mise à jour par l'auteur. 37 p. (*Actualités scientifiques et industrielles*). Paris, HERMANN, 1933. ISIS

Carnap, Rudolf. Die Aufgabe der Wissenschaftslogik. 30 p. (Einheitswissenschaft, Schriften h. v. OTTO NEURATH i. Verbindg. m. R. CARNAP, H. HAHN, 3). Wien, GEROLD, 1934. ISIS

Carnap, Rudolf. Logische Syntax der Sprache. 274 p. (Schriften z. wissenschaftl. Weltauffassung, 8). Wien, SPRINGER, 1934. ISIS

Carnap, Rudolf. La science et la métaphysique devant l'analyse logique du langage. Traduction du général ERNEST VOUILLEMIN. Introduction de MARCEL BOLL. 45 p. (*Actualités scientifiques et industrielles*, 172). Paris, HERMANN, 1934. ISIS

Reviewed by L. P., *Revue générale des sciences* 46, 95, 1935.

Carnap, Rudolf. Le problème de la logique de la science : science formelle et science du réel. Traduction du général ERNEST VOUILLEMIN, 39 p. Paris, HERMANN, 1935. ISIS

Reviewed by HÉLÈNE METZGER, *Archeion* 18, 104-08, 1936.

Dingler, Hugo. Philosophie der Logik und Arithmetik. 198 p. München, REINHARDT, 1931. ISIS

Hahn, Hans. Logik, Mathematik und Naturerkennen. 33 p. (Einheitswissenschaft, Schriften hg. v. OTTO NEURATH u. ander., H. 2). Wien, GEROLD, 1933. ISIS

Hönigswald, Richard. Geschichte der Erkenntnistheorie. vi+192 p. (Geschichte der Philosophie in Längsschnitten, Bd. 9). Berlin, JUNKER und DÜNNHAUPT, 1933. ISIS

Lewis, Clarence Irving; Langford, Cooper Harold. Symbolic logic. xii+506 p. (Century philosophy series). New York, Century, 1932. ISIS

Reviewed by HENRY BRADFORD SMITH, *Philosophy of science* 1, 239-46, 1934.

Poirier, René. Remarques sur la probabilité des inductions. 226 p. Paris, VRIN, 1931. ISIS

Scholz, Heinrich. Geschichte der Logik. vii+78 p. (Gesch. d. Philos. in Längsschnitten, hrsg. v. W. MOOG., 4). Berlin, JUNKER und DÜNNHAUPT, 1931. ISIS

20. — MATHEMATICS

Agostini, Amedeo. Le funzioni circolari e le funzioni iperboliche trigonometria piana e sferica. Estratto dall' *Enciclopedia delle matematiche elementari* 2, 545-615, 1936. ISIS

Agostini, Amedeo, I problemi geometrici elementari e i problemi classici. Estratto dall' *Enciclopedia delle matematiche elementari* 2, 485-539, 9 fig., 1936. ISIS

Archibald, Raymond Clare. Outline of the history of mathematics. Third edition revised and enlarged. 62 p. Mathematical association of America, 1936. ISIS

We welcome the third edition of this *Outline*, first published in 1932; we are sure it will continue to be of service to students and teachers, and we hope it may lead at least a few to the abundant literature thus opened to them. G. S.

Davis, Harold T. The theory of linear operators from the standpoint of differential equations of infinite order. xiv+628 p. (Monograph of the Waterman Institute of Indiana University, 72). Bloomington, Indiana, Principia Press, 1936. ISIS

" In writing the present volume the author has had in mind the preparation of an outline of the theory of linear operators and the applications of this theory to the study of general types of linear functional equations. He has sought to trace the development of the subject from its origin in the symbols of integral and differential calculus down to the present time when the invention and exploration of new operational symbolism has become one of the important methods of extending the domain of analysis. Throughout the book the author has attempted to indicate the many problems, in essentially all domains of science, which lead to operators of the type studied here. A number of typical examples of these applications have been given." Prof. DAVIS is warmly to be congratulated for the completion after many years of research of this *magnum opus*. His friends who had followed the progress of his work rejoice with him, and await with confidence the judgment of competent critics. In the meanwhile it is necessary and sufficient in this journal to point out that the historian of mathematics will find much grist for his own mill in this volume. This is especially true of chapter I which contains in outline the history of the subject, but there are valuable historical notes in almost every chapter. Finally, there is in the end an abundant bibliography (p. 571-616). G. S.

Loria, Gino. Quo vadimus? Atti del Congresso internazionale dei matematici, Bologna, 3-10 settembre 1928, 421-26, Bologna, ZANICHELLI. ISIS

Miller, G. A. A dozen mathematical errors in WEBSTER's dictionary. *Science* 84, 418-19, 1936. ISIS

Sarton, George. Study of the history of mathematics. v+113 p. Cambridge, Mass. Harvard University Press, 1936. ISIS

Reviewed by J. PELSENEER, *Revue de l'Université de Bruxelles* 42, 24-30, 1936-37; by A. POGO, *Popular astronomy* 44, 464, 1936; by Sir THOMAS HEATH, *Nature* 138, 700-01, 1936.

Smith, David Eugene. Sir THOMAS LITTLE HEATH. *Osiris* 2, pt. 1, XVII p., 1 port., 1936. ISIS

Biography with beautiful portrait and bibliography.

Struik, D. J. Concerning mathematics. *Science and society* 1, 81-101, 1936. ISIS

Tandberg, J. Vinkelns tredelning. I and II. Särtryck ur Tidskrift för elementär matematik, fysik och kemi 85-94, 1935; 145-59, 1936. ISIS

On the trisection of the angle, with historical introduction. G. S.

Timerding, H. E. Die Verbreitung mathematischen Wissens und mathematischer Auffassung. (Die Kultur der Gegenwart, ihre Entwicklung und ihre Ziele; Dritter Teil : Mathematik. Naturwissenschaften, Medizin. Bearbeitet unter Leitung von F. KLEIN, E. LECHER, R. v. WETTENSTEIN, FR. v. MÜLLER; erste Abteilung : Die mathematischen Wissenschaften, unter Leitung von F. KLEIN). Leipzig, TEUBNER, 1914. ISIS

Reviewed by LOUIS C. KARPINSKI, *Isis* 25, 489-91, 1936.

Vetter, Q. New tendencies of the mathematical teaching abroad. *Zvláštní otisk z časopisu Střední škola roč.* 16, 258-70 (in Czech). ISIS

Voss, A. Die Beziehungen der Mathematik zur Kultur der Gegenwart. Leipzig, TEUBNER, 1914. ISIS

Reviewed by LOUIS C. KARPINSKI, *Isis* 25, 489-91, 1936.

Wilson, Duncan K. The history of mathematical teaching in Scotland to the end of the eighteenth century. viii+99 p. London University Press, 1935. ISIS

Reviewed by A. INGLIS, *Mathematical gazette* 20, 164-65, 1936.

21. — STATISTICS

(*History and methods. Tables and generalities. For the applications, refer to the sciences to which they are applied*).

Sasuly, Max. Trend analysis of statistics. xiii+421 p. Washington, D. C., Brookings Institution, 1934. ISIS

Reviewed by H. T. DAVIS, *Isis* 25, 491-93, 1936.

III. PHYSICAL SCIENCES

(Knowledge of inorganic nature)

22. — MECHANICS

(*including celestial, and atomical mechanics*)

Deshayes, M. La découverte de l'inertie. Essai sur les lois générales du mouvement de PLATON à GALILÉE. 82 p. Paris, Les Presses modernes, 1930. ISIS

Dirac, P. A. M. The principles of quantum mechanics. (Second edition). xi+300 p. Oxford University press, 1935. ISIS

Reviewed by H. T. DAVIS, *Isis* 25, 493-96, 1936.

Polack, L. S. Sur la question de la critique du mécanisme dans la physique à la fin du XIX-ème siècle. *Archives for the history of science* 9, 289-302, 1936 (in Russian with French summary). ISIS

23. — ASTRONOMY

Adams, Walter S. Recent scientific progress in astronomy. Carnegie Institution of Washington, *News service bulletin*, 4, 63-72, 14 fig., 1936. ISIS

Includes history of the telescope with many beautiful illustrations. G. S.

Le Maire, Octave. L'astronomie à Malines, 1246-1904. *Le folklore brabançon* 16, 18-75, 1936. ISIS

McColley, Grant. The seventeenth-century doctrine of a plurality of worlds. *Annals of science* 1, 385-430, 1936. ISIS

" 'Do there exist many worlds, or is there but a single world? This is one of the most noble and exalted questions in the study of Nature.' So wrote ALBERTUS MAGNUS in the thirteenth century, and in this fashion the philosopher and the poet have written since the dawn of Greek civilization. There was no more important natural problem to the pre-Hellenists of the sixth, fifth and fourth centuries, to the Scholastics of the thirteenth and fourteenth, and to educated men from COPERNICUS to DARWIN. Particularly is this true of the period from GALILEO through NEWTON, when the most profound genius of Europe, and especially that of England, gave itself unreservedly to a study of the unfolding universe. At the opening of the century there existed no telescope to make men companions of the stars; there was no *Principia* to demonstrate the laws which apparently governed the heavens; nor was there present any conception of the island universe or galaxy which we know to-day. Nevertheless there stood behind the century an active and suggestive body of ideas, a symposium made up of Greek thought, of the philosophy of the Schoolmen, of the *indefinite* or *infinite* universe contemplated by COPERNICUS, and of the innumerable suns and systems of GIORDANO BRUNO. Each of these played an important part in the background and formation of the seventeenth-century doctrine of a plurality of worlds."

Mitchell, S. A. Eclipses of the sun. Fourth edition, revised and enlarged. xviii+520 p., 9 fig., 80 pl. New York, Columbia University Press, 1935. ISIS

Reviewed by ALEXANDER POGO, *Isis* 25, 496-504, 1936.

Pogo, Alexander. The lunar appulse of 1936 December 28. *Popular astronomy* 44, 79-81, 2 fig., 1936. ISIS

24. — PHYSICS

Calvert, H. R. Decimal division of scales before the metric system. *Isis* 25, 433-36, 1936. ISIS

" To summarize, the marking off of scale divisions in groups of ten appears to have antedated the invention of decimals, but the large gradations were numbered according to the total number of subdivisions present. The diagonal scale was used for subdividing into tenths in the middle of the 16th century; but only after the introduction of logarithmic scales in 1620 was it realized that the powers of ten could be omitted. By 1750, assuming that the collection in the Science Museum is a fair sample, it was commoner to subdivide an inch into ten parts than into any other submultiple such as eighths or twelfths."

Gheury de Bray, M. E. J. The velocity of light. History of its determination from 1849 to 1933. *Isis* 25, 437-48, 1936. ISIS

" The constancy of the velocity of light has proved to be but a working

hypothesis which must now make way for a new theory more in agreement with the facts. What this theory will be is beyond both the scope of this Paper and the ability of the writer." This paper has a methodological value for historians of science for, " Reference to the original publications showed that several of the observers themselves had misquoted their own results, date, length of base, or even actual velocity, owing either to stating them from memory or to overlooked printer's slips. Successive writers of text books and compilers of Tables had copied these errors over and over again. Spurious determinations had arisen either from the rediscussion of the determinations of some observer by armchair critics or by the averaging (after arbitrary weighting) of several determinations obtained by different observers, and these spurious values have been sometimes inserted in Tables, without discrimination or explanation, thereby adding to the confusion."

Magie, William Francis. A source book in physics. xiv+620 p., 111 fig. (Source books in the history of sciences, GREGORY D. WALCOTT, general editor). New York, McGRAW-HILL, 1935.

ISIS

" In accordance with the general plan of the series, this Source book in physics contains extracts from important contributions made to that science in the three centuries ending with the year 1900 A. D. The period opens with the introduction of the science of dynamics by GALILEO. Throughout the succeeding years the ruling concepts are those of dynamics, developed by NEWTON, and applied by those who followed him to the explanation by dynamical principles of all principal physical phenomena. This era, in which the concepts employed were purely dynamical or mechanistic, came to an end precisely in the year 1900, when a new era of development began with the introduction by PLANCK of the quantum theory of the distribution of energy." " Some principles of selection must be adopted, if such can be found, to determine what should be put in and what should be left out. With some misgivings I decided to recognize the distinction between mathematical and experimental physics, to omit the mathematical arguments, and to include only the experimental results and such expositions of the theoretical results as were given in words by their discoverers. The choice of the selections to be made from the vast mass of experiment was determined by considering what would be of interest to a student whose knowledge of physics had been acquired from textbooks. These principles have not been applied with perfect consistency, and I fear that many matters have been omitted which specialists would like to see included. I trust, however, that nothing has been given which is not worthy of a place among the classics of physics. The prefatory accounts of the lives of the physicists whose works are quoted were taken generally from the histories of physics by POGGENDORFF, HELLER, and ROSENBERGER, when they were given in these books. The accounts of the men whose lives are not included in them were compiled from various sources."

Polack, L. S. On the history of the problem of ether. *Archives for the history of science* 9, 1-22, 1936. (In Russian with English summary).

ISIS

Ward, F. A. B. Handbook of the collections illustrating time measurement. Part I. Historical review. 66 p., 18 pl. London, Science Museum, 1936 (1s. 6d, postage extra). ISIS

Contents : Introduction; 1. Astronomy and time; 2. The principles of time measurement; 3. Sundials, water-clocks and other early devices; 4. Mechanical clocks; 5. Watches and spring-driven clocks; 6. Chronometers; 7. Japanese clocks; 8. Electric clocks; 9. Chronographs; 10. Alarm, striking and repeating mechanisms, time recorders and time switches; List of references, Index. A very valuable contribution to the subject, astoundingly cheap. G. S.

Winter, Heinrich. What is the present stage of research in regard to the development of the use of the compass in Europe? *Research and progress* 2, 225-33, 3 fig., 1936. ISIS

25. — CHEMISTRY, PHYSICO-CHEMISTRY, INDUSTRIAL CHEMISTRY.

Bartow, Edward. Progress in sanitation. *Science* 84, 317-22, 1936. ISIS

Address of the President of the American Chemical Society, Pittsburgh, September 9, 1936.

Gerčikov, M. G. On the history of plastic materials. *Archives for the history of science* 9, 259-88, 1936 (in Russian with English summary.) ISIS

Includes chronological table, 1832 to 1932.

Lippmann, Edmund O. von. Der böse Geist BARRABAS, ein Feind der Alchemisten. *Die Naturwissenschaften* 24, 416, 1936. ISIS

Partington, J. R. Origins and development of applied chemistry. xii+597 p. London, LONGMANS, 1935. ISIS

Reviewed by TENNEY L. DAVIS, *Isis* 25, 504-07, 1936.

Partington, J. R. The origin of modern chemical symbols and formulae. *Journal of the society of chemical industry* 55, 759-62, 1936.

Philip, J. C. Chemistry and the modern state. *Nature* 138, 492-95, 1936. ISIS

From the presidential address entitled " The training of the chemist for the service of the community " to Section B (chemistry) of the British Association, delivered at Blackpool on September 10.

Ruska, Julius. Über den gegenwärtigen Stand der Alchemiegeschichte. *Chemiker-Zeitung* Nr. 72, 5 September, p. 735, 1936. ISIS

Society for the study of alchemy and early chemistry. *Isis* 25, 458, 1936. ISIS

26. — TECHNOLOGY

(*For mining, see* 32. *Geology*; *for industrial chemistry*, 25. *Chemistry*. *See also Arts and crafts under* 45).

Baillie, G. H. Watchmakers and clockmakers of the world. The Connoisseur's Library. General editor : CYRIL DAVENPORT. xiv + 416 p. London, METHUEN, 1929. ISIS

" This volume, which is in the nature of a supplement to the same author's ' Watches,' contains a list of watch and clock makers of the world from the fourteenth century to 1825. The list comprises the names and dates of 25.000 makers, and mentions such works by them as are known. The records of the Clock-maker's Company, thoroughly sifted for the first time, have yielded an accurate list of London makers, and a long research among the manuscripts of the Bibliothèque nationale has brought to light a mass of information about the makers of Paris, who, in consequence of the destruction of the records of their Corporation, have been known mainly by their works."

Davy, M. J. B.; Richards, G. Tilghman. Handbook of the collections illustrating aeronautics — III. The propulsion of aircraft. A brief outline of the history and development of the aero-engine and the airscrew with reference to the national aeronautical collection, and a catalogue of the exhibits. 104 p., 18 pl. London, Science Museum, 1936 (2 s., postage extra). ISIS

Contents : Introduction; Historical survey, 1. Early proposals for the propulsion of aircraft; 2. Introduction of the airscrew; 3. The earliest aero-engines; 4. The use of steam, compressed air, and electrical power; 5. The advent of the light internal combustion engine; Technical survey, 6. Aero-engine design, Vertical type engines, Vee type engines, Opposed cylinder engines, radical type engines, rotary engines, 7. Lubrication systems, 8. Cooling systems, 9. Ignition systems, 10. Fuel supply systems, 11. Carburation and supercharging, 12. Heavy oil engines, 13. Airscrews, 14. Summary of development, Catalogue of exhibits, Bibliographical references. Index. A very valuable book which at the price it is sold is a gift from the S.M. G. S.

Fletcher, Robert; Snow, J. P. A history of the development of wooden bridges. *American society of civil engineers, Transactions*, vol. 99, 314-408, 47 fig., 1934. ISIS

Gibbons, Chester H. History of testing machines for materials. *Transactions of the Newcomen society* 15, 169-84, 1934-35. ISIS

Hesketh, Everard. J. and E. HALL Ltd., 1785 to 1935. viii+58 p., pls. Glasgow, University Press, 1935. ISIS

History of the engineering firm created by JOHN HALL (1764-1836) and still going strong. G. S.

Hornell, James. Evolution of the clinker-built fishing lugger. *Antiquity* 10, 341-45, 2 pl., 1936. ISIS

Jenkins, Rhys. The hollow sword blade company and sword making at Shotley Bridge. *Transactions of the Newcomen society* 15, 185-94, 1934-35. ISIS

Jenkins, Rhys. « Shrinking-on ». *Transactions of the Newcomen society* 15, 73-75, 1934-35. ISIS

" The iron guns of early days were built up of a series of longitudinal bars arranged side by side about a core or mandrel and enclosed in a series of iron hoops or rings, i. e., much in the fashion that a cask is made. Now, frequently, one hears it said that these rings were ' shrunk-on.' It occurred to the writer to question this statement."

Petree, J. Foster. MAUDSLAY, sons and FIELD as general engineers. *Transactions of the Newcomen society* 15, 39-61, 1934-35. ISIS

Robertson, J. Drummond. The evolution of clockwork, with a special section on the clocks of Japan, fully illustrated from the author's collection. Together with a comprehensive bibliography of horology covering over six hundred authors. xvi+358 p., 61 illus. London, CASSELL, 1931. ISIS

" My object has been to trace in broad outline its development through the ' Middle ages,' where we rest on a fairly certain historical basis, down to the adoption of the pendulum and the balance spring as regulating agents in the latter half of the seventeenth century. We then take leave of the traditions of mediaeval practice, and at once enter upon the new era of modern horology and exact time measurement. On that subject, of the writing of books there has been no end, to which my bibliography affords eloquent testimony; and it is not within the scope of this work to add to their number. A few words must be said in justification of the lengthy chapter on the Pendulum, and of the resuscitation of the controversy as to whom belongs the honour of its first application to clockwork, which has raged for wellnigh three centuries. I think that I may claim that the pros and cons have never yet been presented in such detail, supported by original

documents and drawings : in England, at any rate, nothing of the kind has been attempted."... "The section dealing with Japanese clocks is the first attempt to treat this interesting branch of horology comprehensively. Apart from a chapter in M. PLANCHON's work 'L'horloge,' and a few occasional articles, not always accurate, in the technical English and Continental journals, the subject is one which has not received the attention that it deserves; and I trust that the illustrations, derived entirely from my own collection, will serve to show that we have here horological matter of no small interest. Whether viewed from the standpoint of primitive time measurement, of the retention of the mediaeval bar-balance, of ingenious invention, or of artistic treatment, these clocks offer a fascinating study."

Wailes, Rex. Windmills of eastern Long Island. *Transactions of the Newcomen society* 15, 117-51, 10 fig., 1934-35. ISIS

Zeitlin, E. A. The technical revolution in flax-spinning and the beginning of the machine manufacture of flax yarn in Russia. 223 p., 46 fig. (Academy of sciences of the USSR, Transactions of the Institute for the history of science and technology, series 2, issue 9). Moscow, Academy of sciences press, 1936 (in Russian). ISIS

IV. — BIOLOGICAL SCIENCES
(Knowledge of organic nature)

27. — BIOLOGY
(*Generalities, « Natural history »*)

Benedict, Ralph C. History of biology course at Brooklyn College. *Isis* 25, 456-58, 1936. ISIS

Hopkins, Sir **Frederick Gowland.** The influence of chemical thought on biology. *Science* 84, 255-60, 1936. ISIS

Schierbeek, A. Autostasie de organische aanpassingen en het theorema van VAN'T HOFF-LE CHATELIER. *Biologisch jaarboek* 70-94, 1936.

Extension of the theorem of LE CHATELIER to biological adaptations. G. S.

Serebriakov, A. E. The zoological cabinet of the St. Petersburg Kunst-Kammer. *Archives for the history of science* 9, 69-128, 11 fig., 1936 (in Russian with English summary). ISIS

Zirkle, Conway. Further notes on pangenesis and the inheritance of acquired characters. *American naturalist* 70, 529-46, 1936.

ISIS

" In a recent issue of the *American Naturalist* (September-October, 1935), the writer reprinted a number of ancient and medieval accounts of pangenesis and the inheritance of acquired characters. Indeed, the classical and medieval naturalists, almost without exception, believed that acquired characters were heritable, and from 400 B.C. until the nineteenth century the doctrine was accepted as a matter of course. The hypothesis of pangenesis can also be traced to the fourth century before CHRIST and although it was not accepted unanimously, it was believed by the majority of the medieval philosophers and physicians. It is interesting, thus, for us to note that both the doctrine of inheritance that we call Lamarckian and the pangenesis speculations of DARWIN were but restatements of accepted classical views. In the following pages the writer has collected from the older literature a number of passages, not included in the earlier paper, which describe pangenesis and the inheritance of acquired characters."

28. — BOTANY

(*Agronomy, Phytopathology, Palaeobotany*)

Bishop, Carl Whiting. Origin and early diffusion of the traction-plough. *Antiquity* 10, 261-81, 7 fig., 4 pl., 1936. ISIS

" The traction-plough appears at progressively later dates the farther we travel, in whatever direction, from the region where we find the earliest indications of its use — that is to say, in the ancient Near East. Moreover its extension, so far as we have been able to trace it through written records, has invariably been due to diffusion — to culture-borrowing, never to repeated independent invention. There is every reason to believe that the same holds true for prehistoric times also. These facts go a long way toward accounting for that essential unity underlying the agricultural systems upon which have been based the great civilizations of the Old World."

Gager, C. Stuart. The school of horticulture in perspective. *Science* 84, 357-65, 1936. ISIS

Habelt, Theodor. Zur Geschichte der medizinischen Verwendung der Kamille (Matricaria Chamomilla L.). 31 p. Institut f. Gesch. d. Med., Leipzig, 1935. ISIS

Ratfisch, Werner. Zur Geschichte der medizinischen Verwendung des Eibisch (Althaea officinalis L.). Inaugural-Dissertation. 34 p. (Institut für Geschichte der Medizin an der Universität Leipzig). Leipzig, EDELMANN, 1936. ISIS

Ukers, William H. The romance of tea; an outline history of tea and tea-drinking through sixteen hundred years. 302 p., illus., map. New York, KNOPF, 1936. ISIS

Reviewed by CLIFFORD H. POPE, *Natural history* 39, 74, 1937.

Weiss, Walter. Betrachtungen zur Förderung des Anbaues von Heilpflanzen im Erzgebirge. *Archiv für Geschichte der Medizin* 29, 313-20, 1 fig., 1936. ISIS

Zirkle, Conway. The beginnings of plant hybridization. xiii+231 p., 8 pl. Philadelphia, University of Pennsylvania Press, 1935. ISIS

Reviewed by GEORGE SARTON, *Isis* 25, 507-08, 1936.

29. — ZOOLOGY

Klaauw, C. J. van der. Zur Geschichte der Definitionen der Ökologie, besonders auf Grund der Systeme der zoologischen Disziplinen. *Archiv für Geschichte der Medizin* 29, 136-77, 1936. ISIS

Krumbiegel, Ingo. Das sog. Kompensationsgesetz GOETHES betr. Korrelation von Kopfwaffen und Oberzähnen. *Zeitschrift für Säugetierkunde* 6, 186-202, 6 fig., 1931. ISIS

Krumbiegel, Ingo. Artkenntnis und -erkenntnis in der Säugetierkunde, ein Beitrag zur Geschichte der zoologischen Systematik. *Sitzungsberichte der Gesellschaft naturforschender Freunde ausgegeben am* 1. *August*, 1933, 110-25, 12 fig. ISIS

Lameere, Aug. Histoire de la classification des mollusques. 12 p. (Mélanges PAUL PELSENEER). Bruxelles, Mémoires du Musée royal d'histoire naturelle de Belgique, 2ième série, fasc. 3, 1936. ISIS

Oudemans, A. C. Kritisch historisch overzicht der acarologie (critico-historical survey of acarology). Derde gedeelte 1805-1850, Band A, Acari in het algemeen, Holothyroidea Reuter 1909, Mesostigmata Can. 1891. xx+430 p., 179 fig. Leiden, BRILL, 1936 (15 guilders; in cloth 17). ISIS

A long review was devoted in *Isis* 15, 381-86, to the two first parts of this monumental history of our knowledge of Acarida. The present volume does not bear analysis. It will suffice to indicate its availability, and express our gratefulness and admiration to the author. G. S.

V. — SCIENCES OF THE EARTH

(Implying knowledge of both organic and inorganic nature)

32. — GEOLOGY, MINERALOGY, PALAEONTOLOGY, MINING.

(*For palaeobotany, palaeozoology* and *palaeoanthropology, see respectively* 28. *botany*, 29. *zoology and* 39. *prehistory.*

Bailey, E. B. Tectonic essays, mainly Alpine. xii+200 p. Oxford, Clarendon Press, 1935. ISIS

Reviewed by A. M. DAVIES, *Geographical journal* 87, 561-62, 1936. A history of the development of tectonic ideas. C. W. A.

Forbes, R. J. Het Bitumen in de Verfindustrie. 9 p., 8 fig., 1936. ISIS

Hawkins, H. L. Palaeontology and humanity. *Nature* 138, 534-37, 1936. ISIS

From the presidential address to Section C (Geology) of the British Association, delivered at Blackpool on September 14.

33. — METEOROLOGY, CLIMATOLOGY, AND TERRESTRIAL PHYSICS.

Shaw, H. Applied geophysics. A brief survey of the development of apparatus and methods employed in the investigations of subterranean structural conditions and the location of mineral deposits. 102 p., 10 pl. London, Science Museum, 1936 (2 s., postage extra). ISIS

The first edition of this volume appeared in 1931, the second revised in 1932. This is the third revised edition. It is subdivided as follows : Introduction; Magnetic method; Gravitational method; Seismic method; Electrical methods; Catalogue of exhibits in the national collection : — Magnetic, Gravitational, Seismic, Electrical, Index. No less than 150 items are described; many are illustrated; a very learned and carefully written introduction of 44 p. enables one to see each item in its proper perspective. A precious volume. G. S.

VI. — ANTHROPOLOGICAL AND HISTORICAL SCIENCES

(Knowledge of man, past and present)

36. — PHYSIOLOGY

(*human and comparative*)

Heymann, Robert-Christian. Die Geschichte der Entdeckung des Kreislaufs und der Einfluss dieser Entdeckung auf die medizinische

Wissenschaft und Praxis der folgenden Zeit. *Institut für Geschichte der Medizin an der Universität Leipzig*, 51 p., 1934. ISIS

Rolleston, Sir **Humphry Davy**. The endocrine organs in health and disease with an historical review. xi+521 p., 45 ills. London, Oxford Press, 1936 ($ 13.00). ISIS

This superb volume is " the result of the delivery at the Royal College of physicians of London in 1933 and 1934, of the Fitzpatrick lectures on the history of the endocrine organs." The first two chapters relate strictly to the history of the subject, while the remaining twelve are devoted to a detailed analysis and summary of present knowledge on the various endocrine glands. A special historical review introduces each of these chapters.

Sir HUMPHRY writes in his preface : " An attraction in the study of history is the application of its lessons to the present and the future. The limitations of what may be justly called history are ever moving forward, and a record of advances and ideas at any one time may prove useful to the future historian. While paying, it is hoped, due attention to the more remote history of endocrinology, an attempt has here been made to sketch the present knowledge on a subject in a most active stage of growth."

It is difficult to imagine a more successful achievement of the attempt described by Sir HUMPHRY, than what he has himself accomplished. His discussion is strictly up to date, even including a presentation of the evidence for the existence of anti-hormones. The technical discussion is most attractively broken by delightful historical or biographical sketches. A useful feature of the volume is the inclusion of comprehensive biographical references as appended paragraphs to the detailed discussion of each particular subject.

It is impossible to go into a detailed review of the volume even with regard only to its historical aspects. For anyone concerned at all with the history and present status of endocrinology this volume is a necessity. For the historian of medicine it is a valuable reference tool. For the general historian it is an extraordinarily successful effort to summarize an important development in man's understanding of himself. The illustrations are especially well chosen and there is an excellent index. C. D. L.

38. — ARCHAEOLOGY

(*Generalities, methods*)

HISTORY OF ARCHAEOLOGY AND ERUDITION

Morley, Sylvanus G. Guide book to the ruins of Quirigua. viii+205 p., 48 fig. Washington, Carnegie Institution, 1935. ISIS

Reviewed by GEORGE SARTON, *Isis* 25, 511-13, 1936.

39. — PREHISTORY

Brunn, Walter von. Die Trepanation des Schädels. *Mitteldeutsche Volkheit* Nr. 4, 2 p., 1935. ISIS

Brunn, Walter von. Über Trepanationen im sächsisch-thuringischen Kulturkreis. *Archiv für Geschichte der Medizin* 29, 203-15, 13 fig., 1936. ISIS

Clark, John Graham Douglas. The Mesolithic Settlement of Northern Europe. xvi+284 p., 74 fig., 8 pl., maps. New York, MACMILLAN, 1936 ($ 9). ISIS

In this volume Dr. CLARK presents the results of his detailed studies of the cultures of the food-gathering peoples of Northern Europe during the early post-glacial period. It may at once be said that he has produced a work of the very highest order, certainly it is by far the best work on the early post-glacial cultures of this region that has thus far appeared or is likely to appear for a long time. Throughout the work Dr. CLARK draws heavily for his syntheses upon geology and palaeobotany. The methods of geochronology and pollenanalysis are clearly explained, and the general natural history of the area of settlement lucidly described. The result is a model archaeological treatise.

As a consequence of such detailed analyses as Dr. CLARK has here applied the problems and configuration of Maglemose culture have, at least in one area, been rendered clearer. Dr. CLARK's chief contribution is his division of Mesolithic times into three main cultural periods, as *Pre-Boreal* (8300-6800 B. C.), *Boreal* (6800-5000 B. C.), and *Atlantic* (5000-2500 B. C.). This division, we have little doubt, will find a wide acceptance among archaeologists. There is an excellent bibliography, the book is well illustrated chiefly from drawings made by the author, and there is a good index.

M. F. ASHLEY-MONTAGU.

Garrod, D. A. E. The upper palaeolithic in the light of recent discovery. *Nature* 138, 826-30, 1936. ISIS

From the presidential address to Section H (anthropology) of the British Association, delivered at Blackpool on September 10.

MacCurdy, George Grant. Prehistoric man in Palestine. *Proceedings of the American philosophical society* 76, 523-41, 16 pl., 1936. ISIS

Parish, William F. Origin of textiles and the wheel. *Rayon textile monthly*, 19 p., figs., September and October 1936. ISIS

Pull, J. H. The flint miners of Blackpatch. With a foreword by Sir ARTHUR KEITH. 152 p., 23 pl. London, WILLIAMS and NORGATE, 1932. (10 s. 6 d.). ISIS

" A reliable and truly life-like picture is drawn, by the author, of miners and pioneers, who, coming from across the seas nearly four thousand years ago brought the beginning of civilization to England. Some long standing problems associated with the close of the Stone Age are discussed, and the new information obtained from the excavations at Blackpatch is applied to them."

40. — ETHNOLOGY

(*Primitive and popular science*)

Bologa, Valeriu L. LAMACHTOU-KARINA-SAMCA. 22 p., 5 fig. Universitatea « regele Ferdinand I » (Cluj), Biblioteca medico-istorică (Lucrări din Institutul de istoria medicinii şi de Etnografie medicală). Cluj, 1935. (in Rumanian, with French summary). ISIS

" Dans la médecine populaire roumaine le démon tueur des enfants AVESTITZA=SAMCA, joue un grand rôle. Ce démon est vaincu par le saint guerrier SISSINIOS ou SISOËS. Ce cycle de croyances peut être retrouvé avec diverses variantes dans tout l'orient chrétien jusqu'en Abyssinie, chez les Hébreux (LILITH) et chez les Arabes-musulmans (KARINA). On le retrouve attesté dès le commencement du moyen âge (Byzantins, la fresque de Bawit; Hébreux). Pour le cycle roumain on peut trouver son origine dans la filiation suivante : l'Orient méditérranéen asiatique — Byzance — Slaves méridionaux — Roumains du moyen âge. Tous ces cycles se réduisent cependant, dans la dernière analyse, au prototype archaïque assyro-babilonien LAMACHTOU-MARDOUK."

Davidson, D. S. The spearthrower in Australia. *Proceedings of the American philosophical society* 76, 445-83, 10 fig., 1936. ISIS

Lowe, C. van Riet. Mapungubwe. First report on excavations in the Northern Transvaal. *Antiquity* 10, 282-91, 1936. ISIS

Pelseneer, J. Questionnaire de folklore pour servir à l'histoire de la pensée scientifique. 4 p. (XVI[e] congrès international d'anthropologie, Bruxelles, 1935). Bruxelles, Imprimerie médicale et scientifique, 1936. ISIS

Railliet, G. Médecine populaire (Glanes d'un praticien Rémois). II[e] partie : Thérapeutique et matière médicale. *Bull. de la soc. franç. d'hist. de la méd.* 33, 193-212, 1936. ISIS

Yanovsky, Elias. Food plants of the North American Indians. United States Department of Agriculture, miscellaneous publication no. 237, 84 p., Washington, D. C., 1936. ISIS

" About 6 years ago the Carbohydrate division of the Bureau of chemistry and soils undertook a systematic investigation of carbohydrates in plants. At the suggestion of C A. BROWNE, attention was first given to plants used for food by the North American Indians (United States and Canada). As the study of these proceeded, the number of plants was found to be so great that it was suggested that publication of the list itself might be of interest and real value to investigators in ethnobotany and plant chemistry. The original sources have therefore been gone over carefully to make the list as nearly complete as possible. It contains 1,112 species belonging to 444 genera of plants, distributed among 120 families. Communications pointing out omissions and errors in the compilation will be gratefully received. Since the author is not a botanist, the preparation of this list would scarcely have been practicable without the cooperation of botanists. The author is especially grateful to FREDERICK V. COVILLE for his interest in the work, to S. F. BLAKE, senior botanist, for revising the scientific nomenclature, and to OLIVER M. FREEMAN, assistant botanist, for providing the common names of the plants."

44. — HISTORY OF CIVILIZATION

(*General history, Historical methods, Biography and chronology*)

Nordström, Johan. De Yverbornes Ö. Sextonhundratalsstudier. 197 p. Stockholm, BONNIER, 1934. ISIS

Reviewed by O. LARSELL, *Isis* 25, 508-10, 1936.

45. — HISTORY OF ART

(*Art and science. Iconography. Arts and crafts*)

Medicine and art. *Isis* 25, 459, 1936. ISIS

Trapp, Carl E.; Trapp, Mary, C. Psychiatry in art. *Annals of medical history* 8, 511-17, 13 fig., 1936. ISIS

VII. — MEDICINE

50. — HISTORY, ORGANISATION, AND PHILOSOPHY OF MEDICINE

Artelt, Walter. Die Ausbildung des deutschen Arztes bis zur Gründung der Universität Heidelberg. *Zeitschrift für ärztliche Fortbildung* 33, 13 p., 1936. ISIS

Bologa, Valeriu L. Istoria medicinii şi a ştiinţelor, noul humanism, sinteză. Extras din *Revista Gândirea* 14, 8 p. (received in 1936). ISIS

Brunn, Walter v. Von Irrenpflege in alter Zeit. *Medizinische Mitteilungen* 7, 14-16, 2 fig., (no date). ISIS

Brunn, Walter v. Der Krieg als Lehrmeister der Chirurgie. Sonderdruck aus der *Münchener medizinischen Wochenschrift* Nr. 7, 15 p., 1935. ISIS

Brunn, Walter v. Vom Aderlass. *Die medizinische Welt*, Nr. 33, 10 p., 1935. ISIS

Brunn, Walter. v. Was will die Geschichte der Medizin? *Der Jungarzt* 11, 103-07, 1935. ISIS

Clark, P. F. and **A. S.** Second calendar number. Memorable days in medicine. *Medical life* 43, 368-409, 3 facs., 1936. ISIS

List of medical events which happened on particular days from August 1 to October 31.

Christiansen, Johanne. Gyldne Laegeraad saerlight om Diaet. 38 Tegninger af J. Dorph, Gyldendalske Boghandel, Nordisk-Forlag, Copenhagen, 1933. ISIS

Reviewed by KATE C. MEAD, *Isis* 25, 520-21, 1936.

Crummer, Le Roy. CRUMMER room for the history of medicine at the University of California medical school, San Francisco, by C. D. L. *Isis* 25, 458, 1936. ISIS

Diepgen, Paul. Die volkstümlichen und die wissenschaftlichen Grundlagen der Therapie in der Geschichte der Medizin. *Fortschritte der Therapie* 12, 14-23, 1936. ISIS

Grassi, Giuseppe. Il contributo del pensiero italiano alla chirurgia riparatrice. *Rivista di storia delle scienze mediche e naturali* 27, 215-32, 1936. ISIS

Hönncher, Leipzig. Bibliothek des Institutes für Geschichte der Medizin. *Zentralblatt f. Bibliothekswesen*, April 1936. ISIS

Istanbul. Medical history and deontology in Istanbul. *Isis* 25, 456, 1936. ISIS

(**Medicine, history**). The tenth congress of the international association of the history of medicine, Madrid, September 23-29, 1935. By E. B. KRUMBHAAR. *Annals of medical history* 8, 472-74, 1936. ISIS

Pina, Luiz de. « A Igreja na história da medicina portuguesa » separata do II volume do *Arquivo histórico de Portugal*. 31 p. Lisbon, 1936. ISIS

Pina, Luiz de. História das doutrinas humorais e constitucionais em Portugal (resumo). III congresso internacional de história das ciências, em Portugal, 1 p., Lisbon, 1936. ISIS

Reier, Herbert. Zur germanischen Heilkunde. *Klinische Wochenschrift* 15, 15 p., 1936. ISIS

Spector, Benjamin. One hour of medical history. Volume V. xiv+155 p., 20 illus. Boston, Tufts College medical school, 1936. ISIS

This handsome volume of Dr. SPECTOR's original series is devoted entirely to American medicine. It contains a number of portraits and documents and will stimulate the historical curiosity of our medical students. G. S.

Vires, le Dr. L'Hippocratisme médical montpelliérain. *Bull. de la soc. franç. d'hist. de la méd.* 34, 273-88, 1936. ISIS

Weinberger, Bernhard Wolf. A survey of our dental bibliographies and dental histories. Aus den *Berichten des IX. Internationalen Zahnärztekongresses F. D. I.* 297-320, Wien, 1936. ISIS

51. — EPIDEMIOLOGY, HISTORY OF SPECIAL DISEASES. PUBLIC HEALTH AND SOCIAL MEDICINE

Clerf, Louis H. Historical notes on foreign bodies in the air passages. *Annals of medical history* 8, 547-52, 1936. ISIS

Long, Esmond R. Concepts of cardiac pathology before MORGAGNI. *Annals of medical history* 8, 442-47, 3 fig., 1936. ISIS

Macdonald, Eleanor J. A history of the Massachusetts department of public health. *The Commonhealth* 23, 44 p., 1936. ISIS

Monge, Carlos. Politica sanitaria indiana y colonial en el Tahuantisuyo. Comunicacion presentada al X Congreso internacional de historia de la medicina de Madrid. *Anales de la Facultad de ciencias médicas* 17, 233-76, Lima, 1935. ISIS

Sonnenschein, Robert. A brief consideration of the history of the development of mastoidectomy. *Annals of medical history* 8, 500-10, 1936. ISIS

52. — HISTORY OF HOSPITALS, OF MEDICAL TEACHING AND OF THE MEDICAL PROFESSION, BALNEOLOGY, MEDICAL GEOGRAPHY

Brunn, Walter v. Das Maiglöckchen als Symbol des Arztes. *Die medizinische Welt* Nr. 14, 4 p., figs., 1936. ISIS

Diepgen, Paul. Die Leistung und der Geist der Medizin an der Berliner Charité im ersten Jahrhundert ihres Bestehens (1710-1810). *Die Naturwissenschaften* 24, 273-77, 1936. ISIS

Franklin, K. J. A short sketch of the history of the Oxford medical school. *Annals of science* 1, 431-46, 4 pl., 1936. ISIS

Napjus, J. W. De hoogleeraren in de geneeskunde aan de hoogeschool en het Athenaeum te Franeker (1585-1843). *Bijdragen tot de geschiedenis der geneeskunde* 16, 163-70, 1936. ISIS

53. — PHARMACY. PHARMACOLOGY. TOXICOLOGY

Brunn, Walter v. Von alter Apothekerkunst. *Knoll's Mitteilungen für Ärzte*, 5 p., 6 fig., 1935. ISIS

Dörr, Walter. Schrezheim, die schwäbische Apothekengefäss-Manufaktur. *Gesellschaft für Geschichte der Pharmazie, Vorträge*, Stuttgart, p. 7-11, 1 fig., 1936. ISIS

Ferchl, Fritz. Deutsche Apotheken-Altertümer. 16 p. 24 ills. Nürnberg, Germanische Nationalmuseum, 1936. ISIS

Häfliger, J. A. Der Apotheker im Bildertotentanz. *Gesellschaft für Geschichte der Pharmazie, Vorträge*, Stuttgart, p. 12-26, 8 fig., 1936. ISIS

Jacobs, Maurice S. The history of digitalis therapy. *Annals of medical history* 8, 492-99, 1936. ISIS

Noack, Barbara. Zur Geschichte des Thymians. *Institut f. Gesch. d. Med.* 39 p., Leipzig, 1936. ISIS

Noggler, Josef. Die Wiener Apothekerordnungen, 1564-1770. *Gesellschaft für Geschichte der Pharmazie, Vorträge*, Stuttgart, p. 27-46, 1936. ISIS

VIII. — EDUCATION

(the methods of accumulating, imparting and diffusing knowledge)

58. — CATALOGUES OF SECOND-HAND BOOKS ON THE HISTORY AND PHILOSOPHY OF SCIENCE

Many catalogues of second-hand books are so interesting and so full of valuable information that we shall henceforth register them in this section, together with other lists of a similar nature, such as catalogues od scientific medals and prints. When applying to the publishers of these catalogues for a copy, please mention *Isis*.

Art Ancien, S. A., L'. Short list 8 : Early books on architecture, fine arts, botany, physics, technology, zoology. 63 p., 361 items. Zürich, 8 Pelikanstrasse (received Nov. 1936). ISIS

Fock, Gustav. Botanische und zoologische iconographie sowie eine Auswahl seltener älterer Reisewerke. *Antiquariatskatalog* no. 702, 32 p., Leipzig C 1, Schlossgasse 7-9, 1935. ISIS

Goldschmidt, E. P. Books and manuscripts, ancient and mediaeval literature. Catalogue 41. 65 p., 199 items. 4 pl., illus. London, W. 1, 45 Old Bond St. (received Oct. 1936). ISIS

Goldschmidt, E. P. Mediaeval literature. Bibliography. List no. 23, 38 p., 2 facs. London, W. 1, 45, Old Bond St. (received Nov. 1936). ISIS

Goldschmidt, E. P. Science in the XIXth century. List no. 22. 39 p., 302 items. London, W. 1, 45, Old Bond St. (received Oct. 1936). ISIS

Hoosier, Bookshop Medical miscellany. Americana medica with biographical and miscellaneous selections from recent purchases (List 46). 173 items. Indianapolis, Indiana, 2242 Park Ave. (1936). ISIS

Høst, Andr. Fred. Botany, a collection of botanical books from the libraries of C. RAUNKIAER and others. 72 p., 2312 items. Copenhagen, 35 Bredgade (received Oct. 1936). ISIS

Høst, Andr. Fred. Geologi, mineralogi, astronomi, meteorologi, kemi-fysik, matematik. *Antikvaria* no. 30. 97 p., 2117 items. København K, Bredgade 35 (received Oct. 1936). ISIS

Høst, Andr. Fred. Zoology, a fine collection of zoological books from the libraries of the late J. E. V. BOAS and others. Catalogue no. 33. 137 p., 3751 items. Copenhagen, Bredgade 35 (received Oct. 1936). ISIS

Laffitte, Louis. Sciences : 1. Physique, chimie, astronomie, aérostation; 2. Histoire naturelle; 3. Sciences médicales. No. 76, 68 p., 1286 items. Marseille, 156, La Canebière, 1936-37. ISIS

Leighton, J. and J. Catalogue of books including a collection on aeronautics. 66 p., 498 items. London, W. C. 1, 100 Great Russell St. (received Oct. 1936). ISIS

Lier, R. New acquisitions of the old medical books. 81 items. Via S. Felice a Ema, 41, 1936. ISIS

Lowe, Edward C. Catalogue (no. 51) of an interesting collection of old medical and scientific books and manuscripts. 32 p., 155 items. Cheltenham, England, 434 High Street (received Nov. 1935). ISIS

Sotheran, Henry. Catalogue of science and technology, no. 3, Catalogue no. 850. 127 p., 2025 items. London, W. 1, 2-5, Sackville St., 1936. ISIS

Stechert's catalogue of books and periodicals relating to physics (new and second-hand). Catalogue no. 88. 52 p., 1784 items. New York, Stechert (received Oct. 1936). ISIS

59. — MEMORIA TECHNICA

Critical bibliography no. 49. *Isis*, 27, 117-200, 1937. ISIS

This note is published at the end of our bibliography solely for the convenience of the scholars who cut out the whole or part of it, attach extracts to catalogue cards and classify them. By adding this note to the others they will be able to find out rapidly whether this particular bibliography has been analyzed or not. G. S.

Isis no. 70 (vol. 25, 2, 304 p., 6 pl., 26 fig.), Bruges, 1936. ISIS

This number is analyzed in the 49th Critical Bibliography. Every previous number has been analyzed in previous bibliographies. G. S.

60. — ERRATA. Series 38.

(*For previous errata see* Isis, 26, 594 *f.*)

Si quis Argi oculos habere posset eosque omnes diligentissime ac accuratissime intenderet in singulos versus, multa tamen eum inter corrigendum effugerent.

ISIS

Vol. 12, 574, *under* SINGER, C., *read* X, 519-21, *not* 515-21.

Vol. 22, 539. *Last line of title of* MEYERHOF's *edition, read* J. CUSI *not* LUSI.

Vol. 25, 382, l. 18. *Read* non-inflammable *instead of* inflammable.

Vol. 26, 185, *first line*. *Read* grandfather *instead of* uncle.

A few other misprints are not mentioned in these errata because they are too obvious to cause any error or confusion. I wish to express my thankfulness to the readers who take the trouble to make the above-mentioned corrections in their set of *Isis* and the *Introduction*. I would advise them, after having accomplished that little task, to write their initials near mine at the bottom of this note to indicate that these and previous *errata* have been taken into account.

G. S.

These and the previous errata *have been corrected by* .....

Index of Authors Included in the Forty-ninth Bibliography

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The Arabic figures refer to the historical and to the systematic classification (Parts II and III) which are subdivided in sections numbered consecutively from 1 to 60. For instance, Arkell, A.J., 9 indicates that a paper by Arkell is listed in section 9 (India); Auerbach, F., 18, indicates that a paper by Auerbach is listed in section 18 (Philosophy of science).

February 2, 1937. FRANCES SIEGEL.

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History of Science Society

REPORTS FOR 1936

REPORT OF THE SECRETARY-TREASURER

To the President and Council :

I herewith take pleasure in presenting the thirteenth annual report of the Secretary and Treasurer of the Society.

A brief summary of the financial statement is as follows, and a detailed report is herewith attached.

The total membership of the Society for 1936 is 569, with approximately 100 foreign members paying to the Brussels office. The delinquents, resignations and deaths number approximately 100. The total money received is $3,343.00. This includes the money received for *Osiris*, and patrons' dues. The total expenditures are $2,560.95.

The greatest problem which confronts the Society at present is preserving a favorable balance of new members and resignations, and thereby helping to support *Isis* and *Osiris*. That the Society faces the same problems common to all other societies of this kind, namely, change of membership, is made evident by a study undertaken by the Secretary through the American Council of Learned Societies, and by personal interviews with other secretaries. We must conclude that the hardship which resignations and deaths work upon the Society is inevitable, since these circumstances are beyond the control of man and time. After fourteen years of development, we are faced with the loss of a large number of our Foundation Members. The period of retirement from university work does not mean more time for reflection or introspection upon scientific problems and their history, but, unfortunately, retrenchment of finances. This has been the cause of almost fifty percent of the loss in membership for 1936. The decrease in membership plus the deficit from non-payment of dues is, in the total, not as great a loss in terms of dollars as it would at first seem to be. Our contribution to the support of *Isis* for 1936 is only $124.00 less than it was in 1935. This deficit may be reduced at least fifty percent, for experience has shown that many who are delinquent pay the following year. That is, there are some who pay every

two years, and some will pay the amount which they are in arrears, and resign. It is therefore very poor policy to drop members from the roll, particularly if they are old members, without giving them a polite warning. The main activity of this office should be the securing of new members. Of course, this does not preclude efforts being made by members. Cooperation is always welcome. That the field is wide open is only too apparent to the Secretary, who has the greatest opportunity to survey the vast amount of historical and scientific literature issuing from the press. Out of those articles which I examine, about one in every twenty-five bears upon some phase of history. This does not include scientific books with historical introductions. Therefore, it is urgently requested that members notify the secretary when they run across authors of such articles and books. It is the official duty of the Secretary to send out an invitational engraved card, signed by the President, to the prospective candidate. For further information, see the report for 1935 as to detailed methods adopted by the Secretary. Persistent and consistent work on this phase of the Society's work should be maintained at all costs. Not alone do we wish to offset the constant loss, but we must maintain a steady growth and advance, and therefore increase the financial resources of the Society.

To increase the support of *Isis* and the Society, a material aid would be a well worked out policy of securing high grade book advertisements. There should be no objection to accepting such a medium of income. All scientific and literary publications of recognized merit have adopted such a policy, and therefore it is recommended that the Council consider this matter with the editor as a definite project.

With the constant effort on the part of the Secretary toward increasing our membership goes the additional task of acknowledging the receipt of a large influx of mail from other societies and institutions, hotel managers, chambers of commerce, railroads, book publishers, individuals, and members. All these are seeking legitimate information, which, out of all fairness to the enquirers as well as to the prestige of the Society, should be acknowledged. There is no possible way to simplify this work. I make this statement to show you some of the routine work of this office, and to justify the expenses incurred by this office.

The additional cost to the Society of this year's work comes from the new publication, *Osiris*. This, as a matter of interest, has involved considerable delay in our regular routine, particularly as it interfered with the activity of securing new members, and absorbing money which should have gone for this work. The extra expense consisted of preparing 700 special letters to all members. Each was typed so as to be a personal letter, and enclosed with it was a printed circular. The items which

make up this additional expense are extra printing, postage, secretary's time, receiving orders and money, keeping a special record of both, writing follow-up letters for non-payment, explaining that *Osiris* is not included in the dues, that each volume must be paid for separately, computing discount rates for book dealers, and answering complaints about non-receipt or receipt of defective copies of *Osiris*. All this expense came from the Society's fund as a direct contribution to Dr. SARTON.

In addition to assisting Dr. SARTON with *Osiris*, the Society has, with the aid of the American Council of Learned Societies, secured assistance for nine scholars, enabling them to publish their books. The work in connection with the sale of these has also been a considerable item as far as the time of this office is concerned. (See list attached).

Struggling with these phases of the Society's growth, the work of the Secretary's office can only be completely accomplished if he should work three hours each night for six nights in the week. This he manifestly cannot do, out of fairness to his official position, income of the Society, and the health of his assistants. However, for the past three years, this record has almost been attained. Had it not been for the additional money from the patrons' contributions, all this work could not have been accomplished. The time has now arrived when the Society must readjust itself, due to this growth or expansion, and think in terms of professional service. To carry on in the manner of the past, namely, night work, can only be called temporary, or at best, an amateur policy. I, for one, should greatly desire to carry on, but I have reached the point where my personal ambition must be considered. Therefore may I ask you to consider my resignation as Secretary-Treasurer, to become effective at the end of 1937.

There in one thing, however, I should like to have go on record, that what I have accomplished, small in comparison to what I should have liked to do, be not considered so much in the light of devotion to a cause, as a contribution to a movement.

Respectfully submitted,
FREDERICK E. BRASCH.

The total membership, excluding those paying to the Brussels office, is 625. Of this number, 56 were taken from the roll due to death, retirement, and non-payment of dues.

445 paid for 1936
44 not paid (as yet)
80 new members

569 active members

There are approximately 100 members in Europe who pay direct to the Brussels office, of which no record is kept other than the membership. Some of these may be on the exchange list, gifts, or otherwise.

Total amount of money received from 1935 and 1936 dues is .	$2225.00
Total amount of money received from *Osiris*, vols I and II ...	783.00
Patrons' contributions for 1936	300.00
Book fund royalties	35.00
	$3343.00

Total expenditure for 1936	
Contributions to *Isis*	$1780.00
Secretarial service	487.00
Printing and mimeographing	101.80
Postage and express	82.50
Transportation	55.00
Bank charges	29.65
Am. Coun. of Learned Soc	25.00
	$2560.95

Respectfully submitted,
FREDERICK E. BRASCH.

HISTORY OF SCIENCE SOCIETY

COUNCIL RECORD

Meeting December 30, 1936, 2:00 *p.m.*

The Council of the History of Science Society met in the Faunce House Lounge, Brown University, with Dr. CHAUNCEY D. LEAKE, President, in the chair. The following members of the Council were present: Mr. BRASCH, Dr. FULTON, Dr. HOPKINS, Dr. KARPINSKI, Dr. LARKEY, Dr. LEAKE, Dr. SHRYOCK, Dr. SIMONS, Dr. VIETS.

The minutes of the last meeting were read and approved.

Dr. LEAKE made an informal report. During the summer, a letter was sent to all scientific societies, presenting the work of the Society. As a result, one or two societies became members and several replied with letters of inquiry concerning ways and means for fuller cooperation in attaining common ends.

The reports of the Corresponding Secretary-Treasurer were read and approved with an expression of appreciation and gratitude on the part of the Council to Mr. BRASCH for his faithful services.

A motion was then passed that an Auditing Committee be appointed by the President to examine into the books of the Society and to render a report.

No report was offered by the chairman of the book fund committee, Dr. BRETT.

A written report from Dr. SIGERIST, chairman of the committee for the publication of a glossary of Latin medieval scientific and medical terms was accepted. The continuance of the committee was authorized.

The following officers were declared elected : For president 1937-38, Dr. CHAUNCEY D. LEAKE; for vice-presidents, 1937-38, Dr. HENRY E. SIGERIST, Dr. L. C. KARPINSKI; for members of the Council to serve until December, 1939, Dr. OTTO GLASSER, Cleveland Clinic, Cleveland, Ohio, Dr. SANFORD V. LARKEY, Johns Hopkins University, Dr. GREGORY D. WALCOTT, Long Island University, Dr. JAMES F. COUCH, Bureau of Animal Industry, Department of Agriculture, Washington, D. C., Dr. VICTOR F. LENZEN, University of California.

The appointment of Dr. GREGORY WALCOTT to represent the Society before the Council of Learned Societies for three years was approved.

Mr. F. E. BRASCH was re-elected to the office of Corresponding Secretary-Treasurer for the year 1937.

Dr. LAO G. SIMONS was also re-elected to the office of Recording Secretary for 1937.

A letter from the secretary of Dr. SARTON, editor of *ISIS*, was read to the Council. There was an article enclosed, bearing on the establishment of An Institute for the History of Science and Civilization. Considerable discussion of problems connected with the Society followed.

Meeting adjourned at 4 p.m.

Recording Secretary, LAO G. SIMONS.